

TESTING FOR SMOOTHNESS
AND QUIETNESS

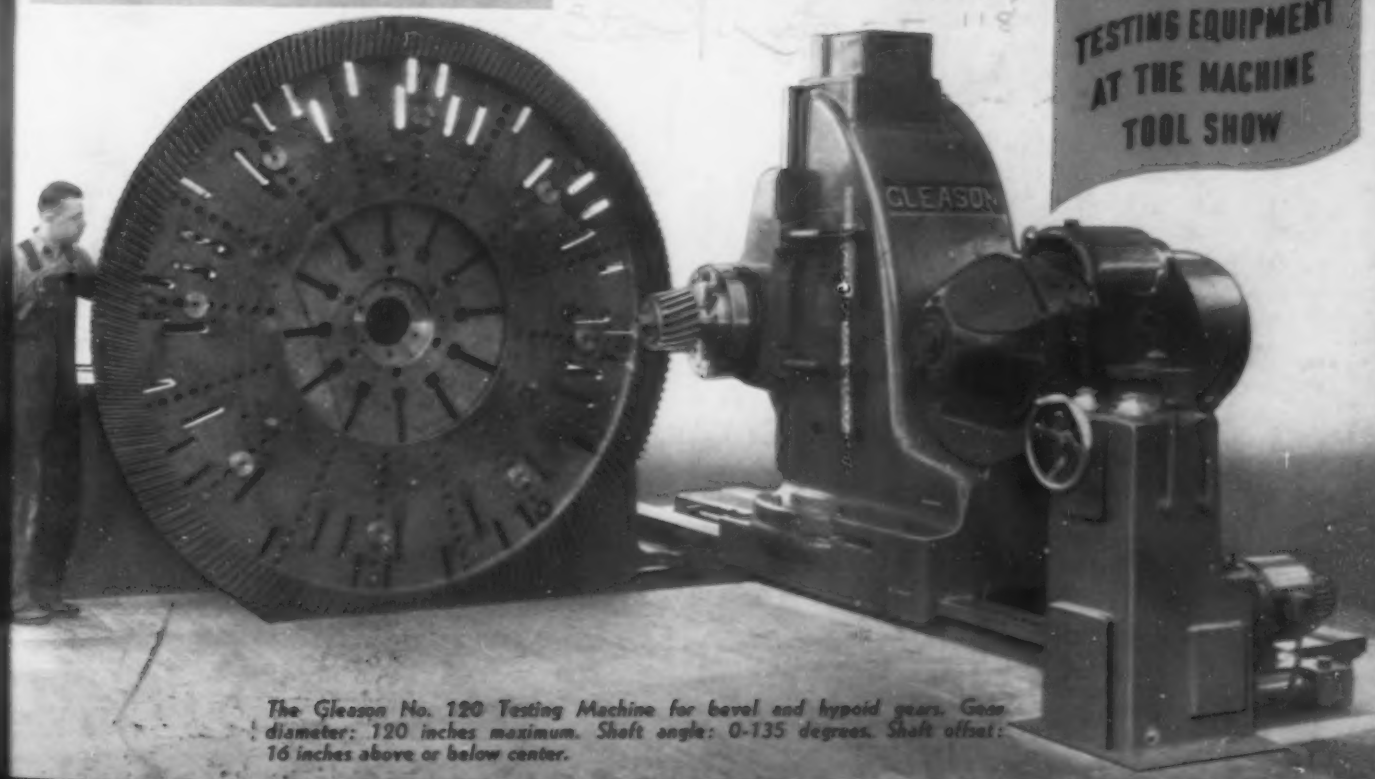


THE IRON AGE

AUGUST 10, 1939

The Gleason No. 4 Angular Testing Machine for bevel and hypoid gears. Gear diameter: 6 1/2 inches maximum. Shaft angle: 0-180 degrees. Shaft offset: 1 1/4 inches above or below center.

SEE GLEASON
TESTING EQUIPMENT
AT THE MACHINE
TOOL SHOW



The Gleason No. 120 Testing Machine for bevel and hypoid gears. Gear diameter: 120 inches maximum. Shaft angle: 0-135 degrees. Shaft offset: 16 inches above or below center.

need for smooth, quiet-running bevel gears has made
ing necessary in their production.

son testing machines meet this need by approximating
ce conditions of load and speed and proving gears
ound, tooth contact, tooth size, tooth spacing, and
centricity.

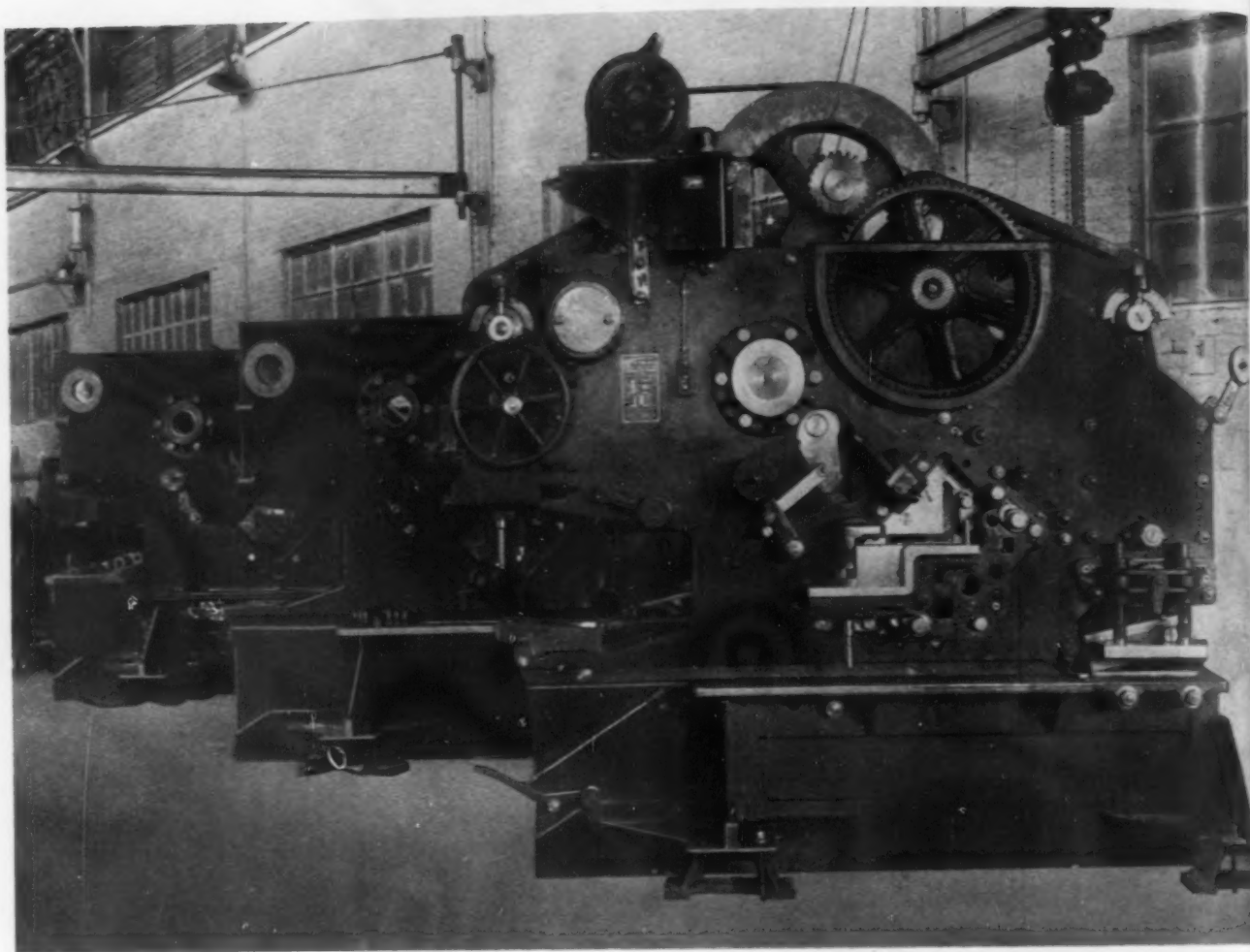
There's a Gleason machine for testing every size and type of
bevel and hypoid gear. Write for the new leaflet on Gleason
principles and methods of BEVEL GEAR TESTING.



GLEASON WORKS

Builders of Bevel Gear Machinery for Over Seventy Years

1000 UNIVERSITY AVENUE, ROCHESTER, N. Y., U. S. A.



Assembling No. 4½ "Buffalo" U. D. Machines. Modern production methods help keep costs down.

Here's how to CUT, PUNCH and SHEAR on a Production Basis!

Are old-fashioned bar-cutting, shearing, and punching methods slowing up your entire production schedule? Are you paying far too much for this necessary work in your manufacturing operations?

Then why not solve those problems once and for all, just as many other manufacturers have done, with a modern Buffalo Armor

Plate Slitting Shear, Punch and Bar Cutter. This powerful machine will keep going 24 hours a day if necessary and will soon pay its entire cost in the savings it effects. All three operations are synchronized to give you triple service.

Write today for complete information. Sizes to suit your requirements.

BUFFALO FORGE COMPANY

492 Broadway

Buffalo, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

"Buffalo"

PUNCHES, SHEARS and BAR CUTTERS

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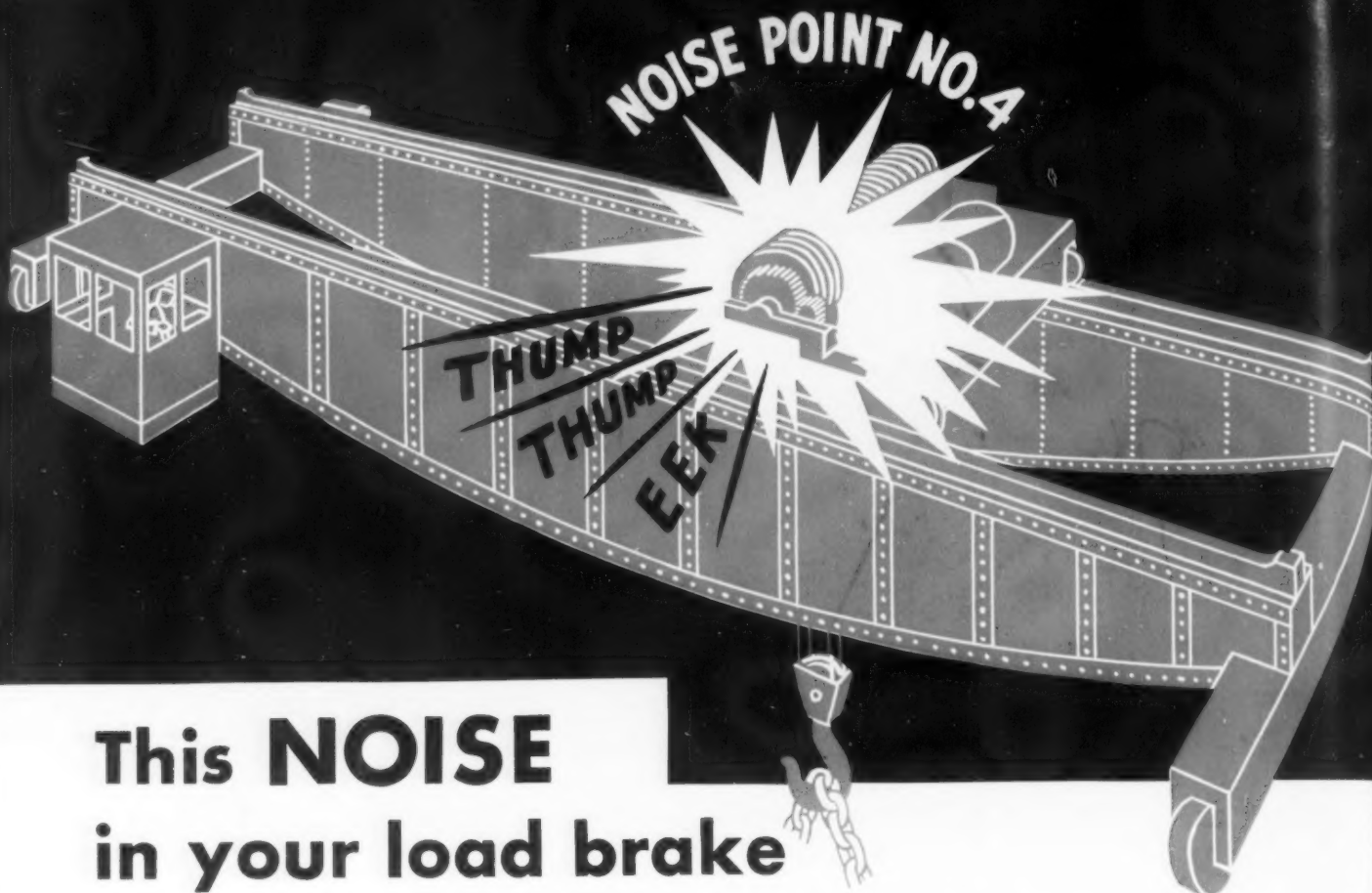
THE IRON AGE

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This NOISE in your load brake means **WEAR!**

If your overhead crane screeches, rumbles, or pounds, it means that parts are rubbing together and wearing. For, in a crane, every "noise point" is a "wear point."

Whiting cranes have been designed for quiet operation. Instead of noisy, inefficient spur gears, Whiting cranes are equipped with smooth, quiet herringbone gears. Anti-friction roller bearings keep these gears in perfect alignment. Flexible couplings transmit power without binding.

Visit a few shops and listen to their cranes. Notice the quieter Whiting operation. Then you'll understand why Whiting cranes give long, trouble-free service. Whiting Corporation, 15601 Lathrop Ave., Harvey, Illinois.
In Canada: Whiting Corporation (Canada) Ltd., Toronto

**CAPACITIES
1 TO 400 TONS**

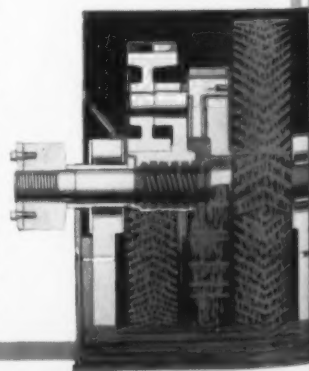


HOW TO WRITE a Traveling Crane Specification

Contains a discussion of the important factors in crane design and complete information on how to specify an overhead traveling crane to fit your individual needs. Will be sent to all production executives on request.

Oil Pump Action at the Load Brake reduces Noise and Wear in Whiting Cranes

At Noise Point No. 4—the load brake—Whiting cranes have a special patented construction. The meshing of the herringbone gears virtually acts as an oil pump, forcing a constant stream of oil between the brake plates as well as to all gears and bearings. Thus, it reduces noise and wear and aids the motor in lowering the load smoothly. The oil also acts as coolant and prevents overheating.



IT PAYS TO GET A QUOTATION ON

WHITING

OVERHEAD TRAVELING CRANE

Quality

R. ATHERTON:

The Iron Age
August 10, 1939

PLATE

The following may be of general interest:

Page 138 - Reference to plant expansion at General's Buffalo plant. (Mr. Ingraham is familiar with this item.)

WCK

To note:

Mr. Tufts
Mr. McAdoo
Mr. Charles F. Weber
Mr. Emmerich
Mr. Ford



use of BethCoLite are
Bethlehem organization.
ore selection through
open-hearth, strip mill and tin mill to the last careful inspection.

BETHLEHEM STEEL COMPANY

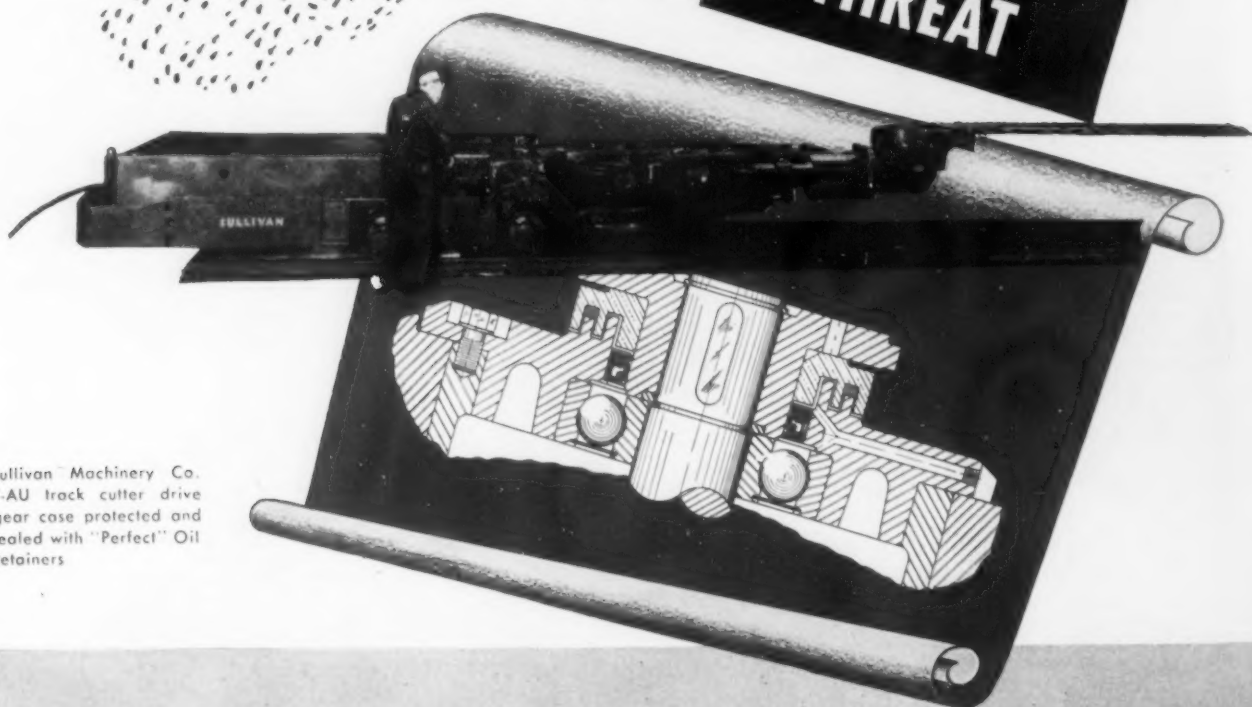


THE IRON AGE, August 10, 1939—3

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BUG DUST

NO LONGER A SERIOUS THREAT



Sullivan Machinery Co.
7-AU track cutter drive
gear case protected and
sealed with "Perfect" Oil
Retainers

EXCEPT for adequate seals, the drive gear and drive sprocket bearings of this Sullivan Coal Cutter would be fatally vulnerable to "Bug Dust" (finely divided coal particles).

Although when "top cutting" these bearings are subjected to a constant shower of coal particles, they are completely protected

by Chicago Rawhide "Perfect" Oil Seals—which also prevent leakage of lubricant from the bearings.

This is just another instance of protection that increases bearing life and reduces bearing maintenance in the production plant—on the sea—in the air—and now underground.

Ask FOR INFORMATION
CONCERNING YOUR SEALING PROBLEM

CHICAGO RAWHIDE MANUFACTURING CO.

1306 ELSTON AVENUE, CHICAGO, ILLINOIS

60 Years Manufacturing Quality Mechanical Leather Goods Exclusively

PHILADELPHIA • CLEVELAND • NEW YORK • DETROIT • BOSTON • PITTSBURGH • CINCINNATI

4—THE IRON AGE, August 10, 1939





OVER 18,000 MORE MEN ON THE PAYROLLS...

● The first Warner & Swasey turret lathe was shipped to the Crane Company, Chicago.

At that time, The Warner & Swasey Company employed 15 men. The Crane Company employed about 1000 men.

For nearly 60 years Warner & Swasey has built turret lathes. The Crane Company has bought scores of these turret lathes, pursuing a policy of expanding its machine tool equipment, replacing their old equipment as more productive machine tools were developed.

For over half a century both The Warner & Swasey Company and The Crane Company have consistently replaced obsolete equipment with more modern, faster machines. Again and again these companies have stepped up the capacity of their plants by the installation of more modern equipment. The number of men employed by these companies has increased year after year until today The Crane Company employs 18,000 men; Warner & Swasey Company employs 1500 men.

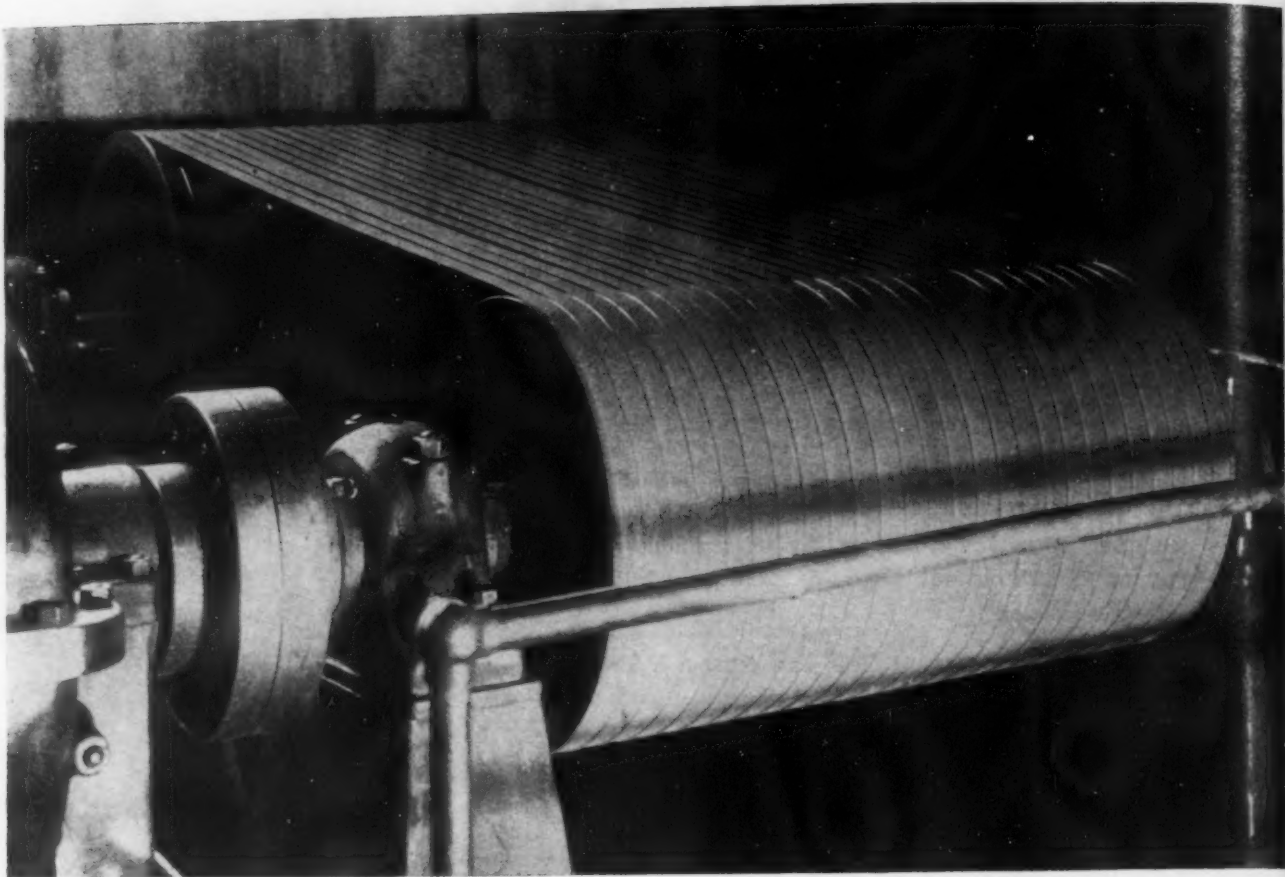
It is a significant fact that the payrolls of both of these companies have steadily increased as more and better manufacturing equipment has been installed.

Today these two companies employ nearly 20,000 men. The employment of more and more men has gone forward hand in hand with the replacement of old, inadequate equipment.



YOU CAN TURN IT BETTER, FASTER,
FOR LESS WITH A WARNER & SWASEY

**WARNER
&
SWASEY**
Turret Lathes
Cleveland



Goodrich tension-matched V-Belts last 14 times longer on belt-killing turbine drive

BELT cost was high on the big steam turbine drive shown above. Ordinary V-Belts could not pull the load; and failed in less than a month.

Then Goodrich V-Belts were tried — matched under operating tension so that each belt carries its full share of the load, and slippage and resultant wear are prevented. After 14 months these Goodrich Belts are still running and they look as sturdy as the day they were installed.

Next time you buy V-Belts remember this new additional value — sets matched under operating tension. Belts which measure the same off the drive often — in fact usually —

develop differences in length once they start operating. The longer belts then slip, wear out, put undue load on the others. You can avoid this costly failure by specifying Goodrich matched sets — V-Belts measured under operating conditions.

More Goodrich Construction Improvements

There are other Goodrich V-Belt advantages that will save you money, reduce time and work now taken by shutdowns for belt repair and replacement. Some of these are a rubber-and-fabric cover to protect the belt from dust and moisture; low-stretch cords which reduce stretch and slippage; Age-Rite, a compound to help Goodrich belts resist oxidation; and a special rubber compound which reduces internal heat by 75%.

V-Belts should and can be an efficient, trouble-free, economical means of transmitting power. Call in your Goodrich Distributor and let him show you the improvements in Goodrich V-Belts which make these belts last so much longer than belts of even a few years ago. The B. F. Goodrich Company, Mechanical Rubber Goods Division, Akron, Ohio.



Goodrich machine which measures Goodrich V-Belts under actual operating tension.

Recent Improvements in Goodrich V-Belt

1. New designs of low-stretch cords—every foot made to Goodrich specifications.

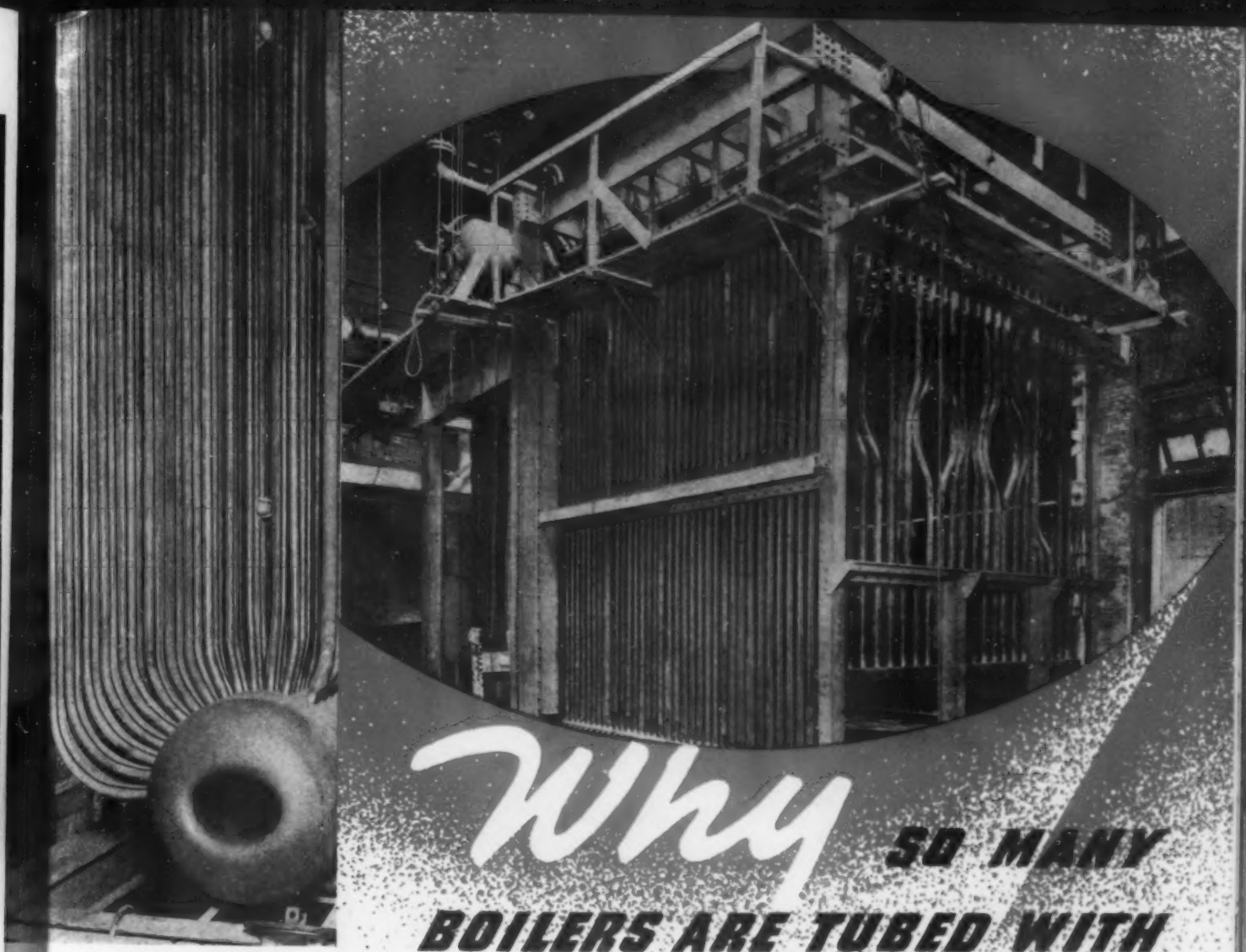
2. Improved cover compounds for resistance to light, air, oil.

3. Cool-flexing rubber—outlasts rubber of far higher tensile strength.

4. Matched sets—belts of same length measured while actually running under full load. Special machine to do this invented by Goodrich research men.

Goodrich

ALL *products* *problems* IN RUBBER



Why **SO MANY**
BOILERS ARE TUBED WITH

ELECTRUNITE

REG. U. S. PAT. OFF.

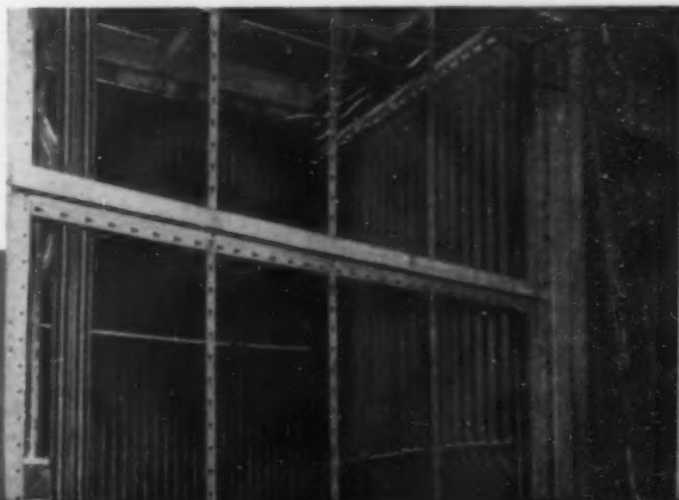
THE MODERN ELECTRIC RESISTANCE WELDED BOILER TUBES

• These two new 60,000 lbs. per hr. C-E Type VU two-drum steam generators, designed for 500 lbs. pressure and 665° F. steam temperature, are tubed with ELECTRUNITE. They were built for the East St. Louis, Ill., plant of Armour & Company by Combustion Engineering Co., Inc., New York.

Boiler users are specifying ELECTRUNITE. Boiler manufacturers are using these modern tubes for all types of heat transfer equipment.

Why? Because ELECTRUNITE Boiler Tubes

have proved beyond doubt that they are safe, sound, long-lasting and surprisingly low in installation and maintenance costs. Let us show you facts and figures to substantiate these statements.

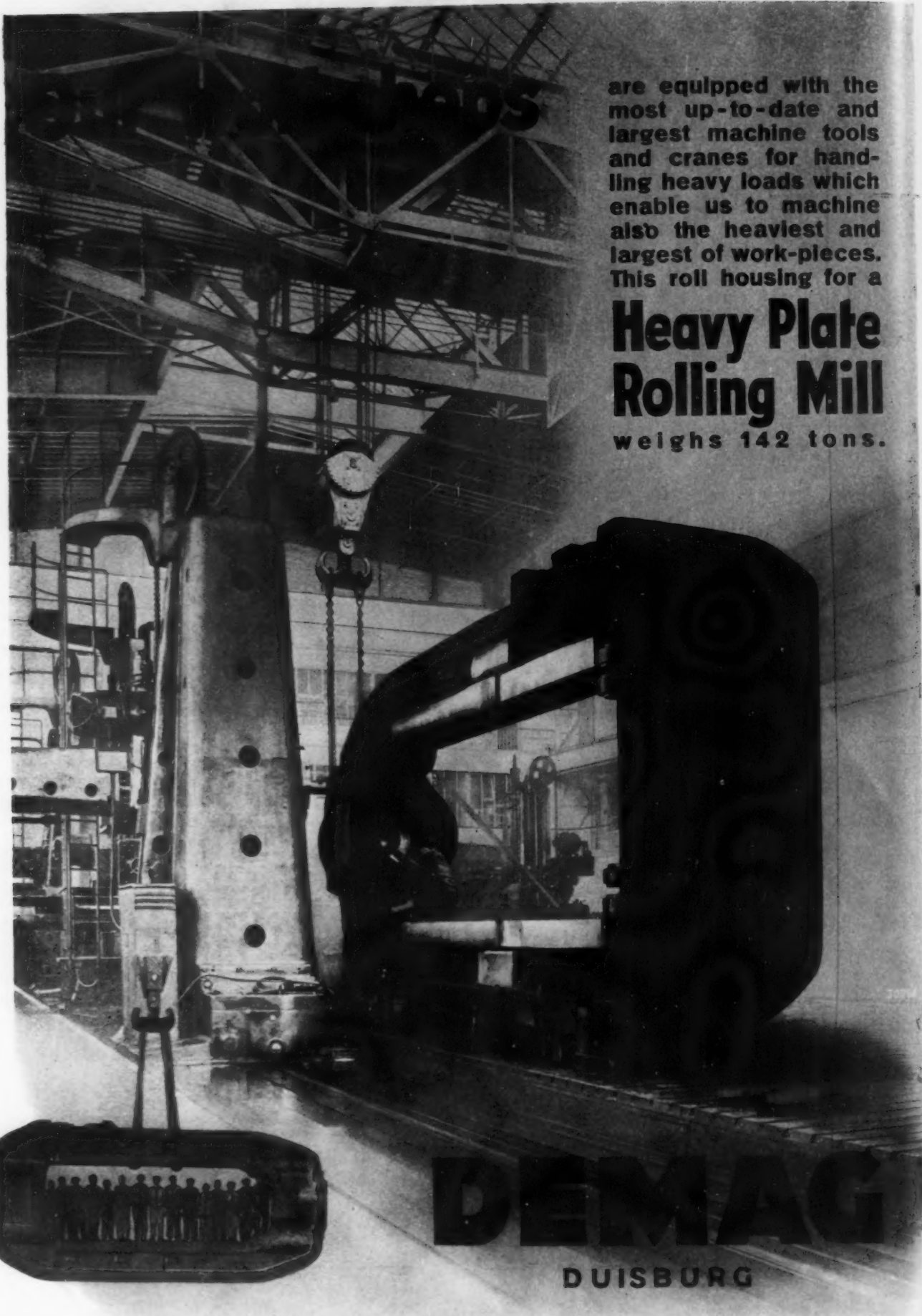


Steel and Tubes, Inc.

WORLD'S LARGEST PRODUCER OF ELECTRICALLY WELDED TUBING

CLEVELAND OHIO

SUBSIDIARY, REPUBLIC STEEL CORPORATION



are equipped with the most up-to-date and largest machine tools and cranes for handling heavy loads which enable us to machine also the heaviest and largest of work-pieces. This roll housing for a

Heavy Plate Rolling Mill

weighs 142 tons.

DEMAG

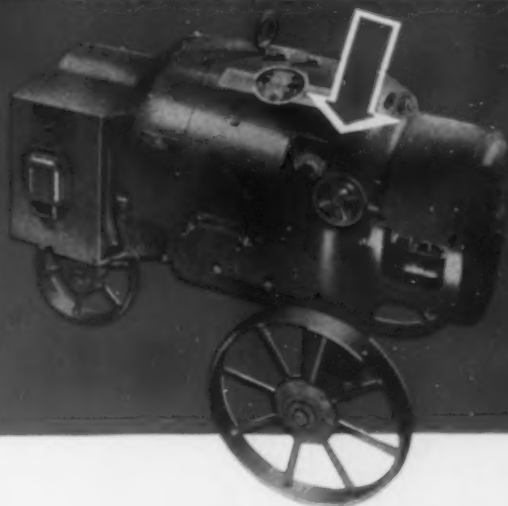
DUISBURG

For further information please apply to:
DEMAG, Duisburg (Germany)

TRY THE "WORK-PER-DAY" TEST—



MAKE ANY TEST YOU LIKE!
THE ANSWER IS THE **FLEXARC** WITH
JUST **ONE PRE-SET CONTROL**



Welding claims mean little. What counts is how fast a welder actually lays down metal *on the job*... whether it holds a truly stable arc... whether it allows the operator to stay on the job and *weld*.

A "work-done-per-day" test with the FlexArc Welder gives a showdown on these facts. **ONE PRE-SET CONTROL** gives any current needed, *constantly*. Readjustments are eliminated... more welding can be done per day because the operator can stay on the job with a faster, constant arc. Test it yourself on this or any other point — but see the **FLEXARC** in operation before you put money into any welder!

NOW . . . YOU CAN RENT A FLEXARC WELDER!

Mail the coupon . . . Ask for details of the FlexArc rental plan. Rental applies against later purchase in full. Westinghouse Electric & Manufacturing Co., East Pittsburgh Pa. Dept. 7N.

J-20813

Westinghouse Flexarc Welders

LET'S HAVE A SHOWDOWN!

- ☐ Please arrange a FlexArc demonstration.
- ☐ Send full details on FlexArc and FlexArc rental plan.

Name.....
Company.....
Address.....
City.....



lies the versatile experience
of a multitude of problems . . .
successfully solved!

Above, a roll-door spring weighing more than 300 pounds . . . at the right the tiniest . . . a radio part that takes over 100,000 pieces to balance a one-pound weight.

Every year, B-G-R makes many thousands of different springs . . . wire forms . . . small stampings . . . in ever-changing variety . . . for a wide variety of mechanical purposes. Large or small, each spring has its own important task to perform in some mechanism.

Orders vary from a single spring up to many millions . . . some springs have load capacities of several thousand pounds . . . others, with working pressures as low as 2 or 3 grams . . . one type may work only a few times an hour . . . another may call for continuous operating speeds as high as 450 times a second . . . many of these springs perform extra duties such as resisting corrosion, vibration, or withstanding high stresses, high temperatures, etc. . . while others involve the most exacting specifications, close tolerances and, perhaps, intricate tooling, or a new and unusual spring application.

B-G-R offers you the flexible facilities of two complete spring plants . . . the resourcefulness of our large staff of technicians . . . helpful counsel in design . . . punctual shipments in any quantity . . . for an all-around Spring Service that's hard to equal. Let us tackle your tough ones, first!

BARNES-GIBSON-RAYMOND

DETROIT PLANT
DETROIT, MICHIGAN

DIVISION OF ASSOCIATED SPRING CORP.

← TWO PLANTS →

COOK PLANT

ANN ARBOR, MICHIGAN

BGR

SPRINGS

SMALL STAMPINGS
WIRE FORMS

Who gets the **MONEY?**

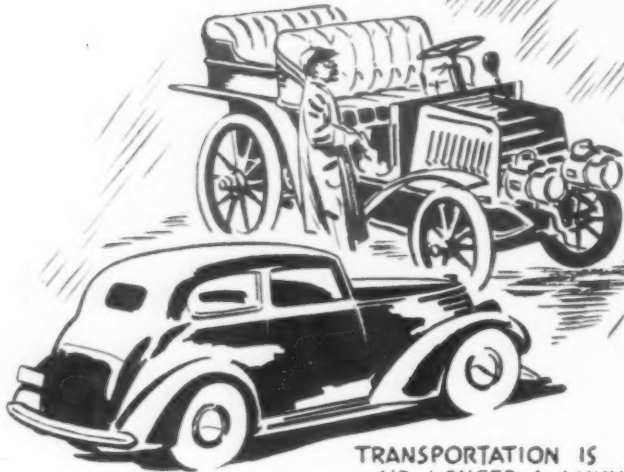


THIS is the fourth of six graphic presentations dealing with the improved machine as a builder of employment and of mass consuming power. The first appeared in THE IRON AGE of May 18, the second on June 8, the third on July 13. The present chapter deals with the distribution of the wealth and income created by the machine.

Machinery has enabled the Average Man to have what formerly *only the rich enjoyed!*

Who receives the benefits of mechanization?

MECHANIZATION, of course, is most intensive in our mass-production industries. Mass-production industries, of necessity, produce for the masses, not for the classes. The greatest developments in invention and improvement in the past three decades have been directed toward putting more possessions in the hands of more people. Turning luxuries into necessities is the chief job of the machine.



TRANSPORTATION IS NO LONGER A LUXURY



TODAY 25 CENTS TAKES YOU AROUND THE WORLD



THE BEST IN MUSIC IS NOW EVERYBODY'S



EVEN THE DOG CAN NOW AFFORD A PORTRAIT

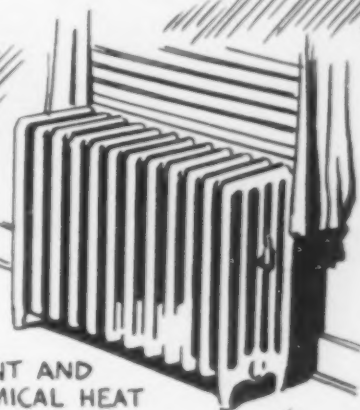
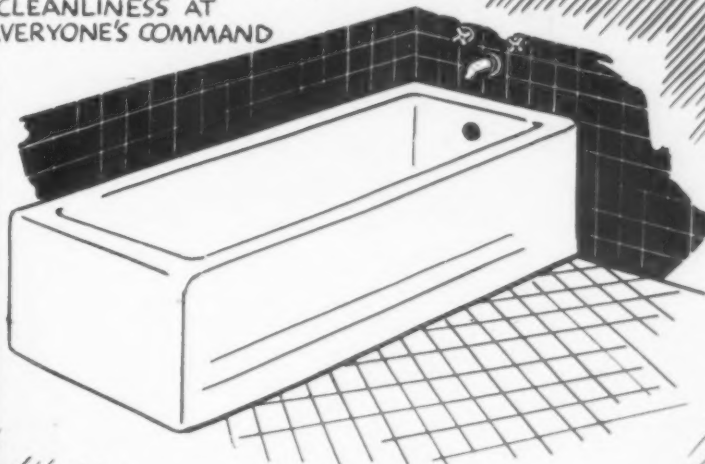


SPLendid LIGHT AT
THE TOUCH OF A BUTTON



REFRIGERATION
WITHIN REACH OF THE MULTITUDE

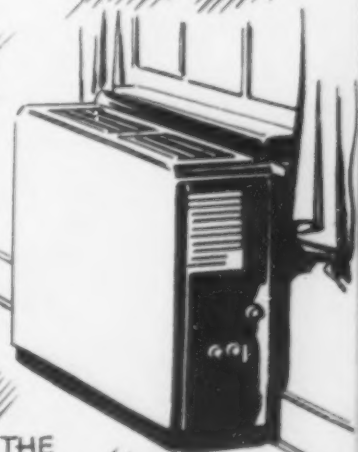
CLEANLINESS AT
EVERYONE'S COMMAND



CONVENIENT AND
ECONOMICAL HEAT

BUT mechanization's job is only half done when it puts the luxuries formerly enjoyed by the rich within the reach of the average man's buying power. The other half of its job has been to put more and better things within the reach of all, rich or poor. Things have been made commonly available that no money could buy in former years because they did not exist. Your grandfather may have been a millionaire, but he could not have bought any of these goods or services with all of his fortune.

AND COOL WEATHER
WHEN YOU WANT IT



CONQUERING THE
THIRD DIMENSION



**..and the Average Man now has
what nobody had before!**

Magicians take the rabbits out of hats . . . but improved machines put purchasing power into pay envelopes!

THESE pages present a few of the accomplishments of improved machinery in its quarter century battle to broaden the distribution of wealth.

By pushing wages up while at the same time reducing cost and pushing prices down, mechanization fights for the masses on two fronts at once. It makes the dollar buy more, while enabling the wage earner to earn more.

Examine these common products which are the possessions of the average man. See how much more advantageously a worker can swap his hours of work today for things that he wants than he could in 1914.

This ought to answer the question as to who gets most of the wealth that improved machinery creates.*

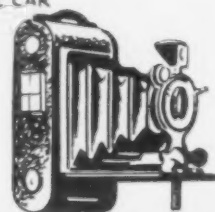
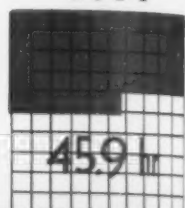
*Average factory wages, 1914, 24.7c. per hr.; 1938, 71.5c. per hr., based on study of earnings in 25 industries by National Industrial Conference Board. Time required to earn products from study by Machinery and Allied Products Institute, based on prevailing price levels.

Hours of Factory Work Required to

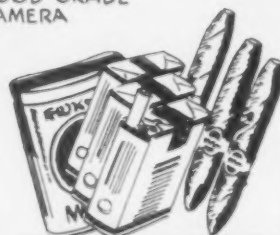
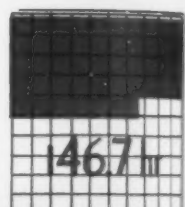
1914



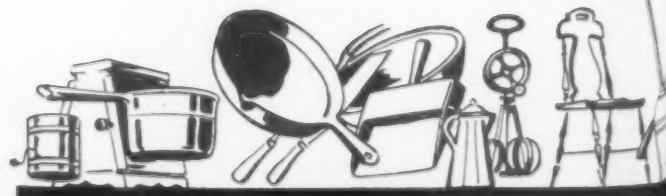
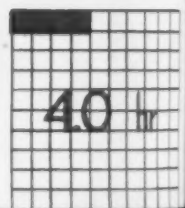
TIRE FOR SMALL CAR



GOOD GRADE CAMERA



WEEK'S TOBACCO SUPPLY



HOUSEFURNISHINGS - 30 ARTICLES



Hours of Factory Work Required to Earn Various Products

1914

1938



1.7 hr

0.2 hr

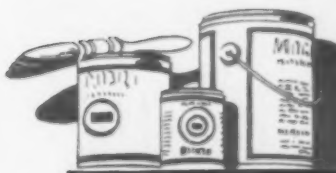
LIGHT BULB - 60 WATT



187.2 hr

67.9 hr

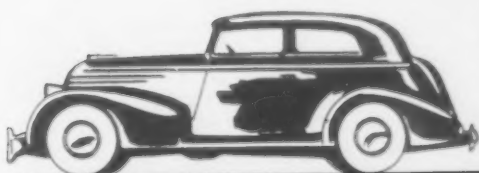
ELECTRIC WASHING MACHINE



59.3 hr

20.3 hr

PAINT FOR AVERAGE HOUSE



451.4 hr

1095 hr

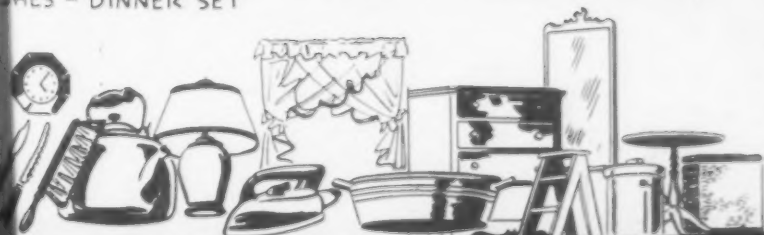
AUTOMOBILE



40 hr

14.4 hr

DISHES - DINNER SET



404.8 hr

266.4 hr



708.5 hr

323.4 hr

Hours of Factory Work Required to Earn Various Products

1938

9.4 hr

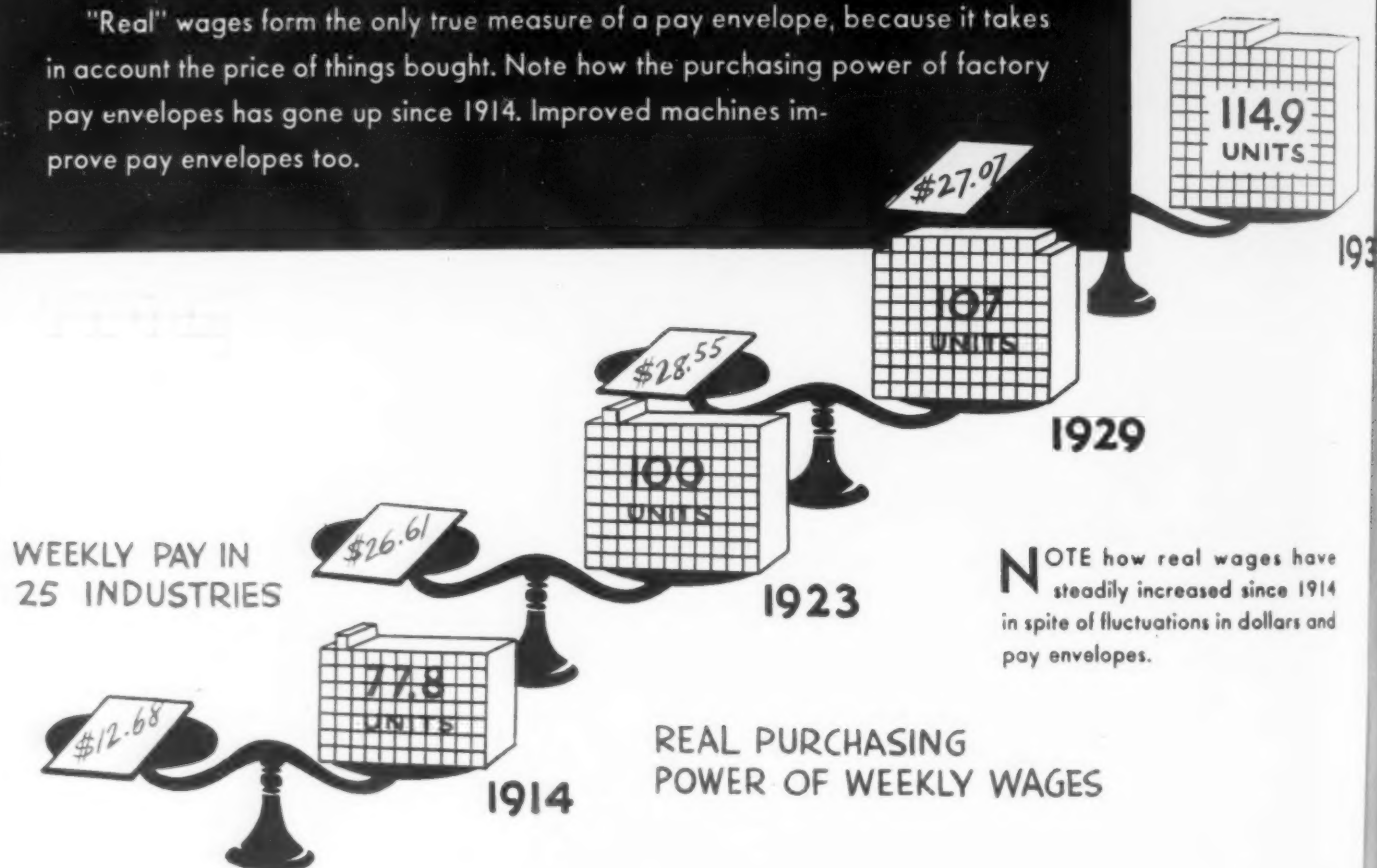
30.3 hr

1.6 hr

Time Saving Machinery increases real wages...

If you measured your height with a rubber tape measure, you would have a hard job to make it twice alike. Money as measured in dollars and cents does not mean a thing, either in or out of the pay envelope. The true measure of money, in or out of the pay envelope is what it will buy.

"Real" wages form the only true measure of a pay envelope, because it takes in account the price of things bought. Note how the purchasing power of factory pay envelopes has gone up since 1914. Improved machines improve pay envelopes too.



THE price mirror makes the same pay envelope look—and feel—either skinny or fat.

and...

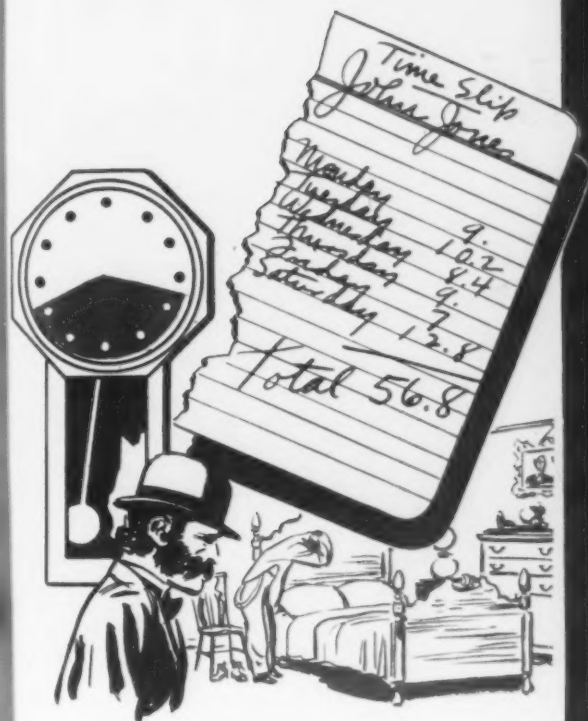
Time Saving Machinery has shortened the working week

MECHANIZATION and the increased production that it makes possible alone can maintain living standards when men work fewer hours per week to make things.

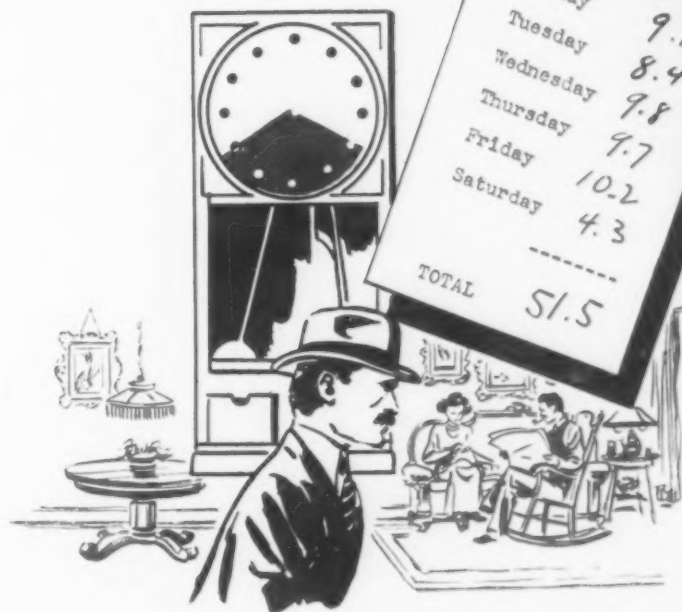
Mechanization has been shortening gradually and constantly the span of the working week.

Take the case of John J. Jones. His grandfather worked an average of 56.8 hr. per week in a factory in 1899. His father worked 51.5 hr. in an average week in 1914. And John worked 36.8 hr. per week in the first month of this current year.

Data from National Industrial Conference Board.

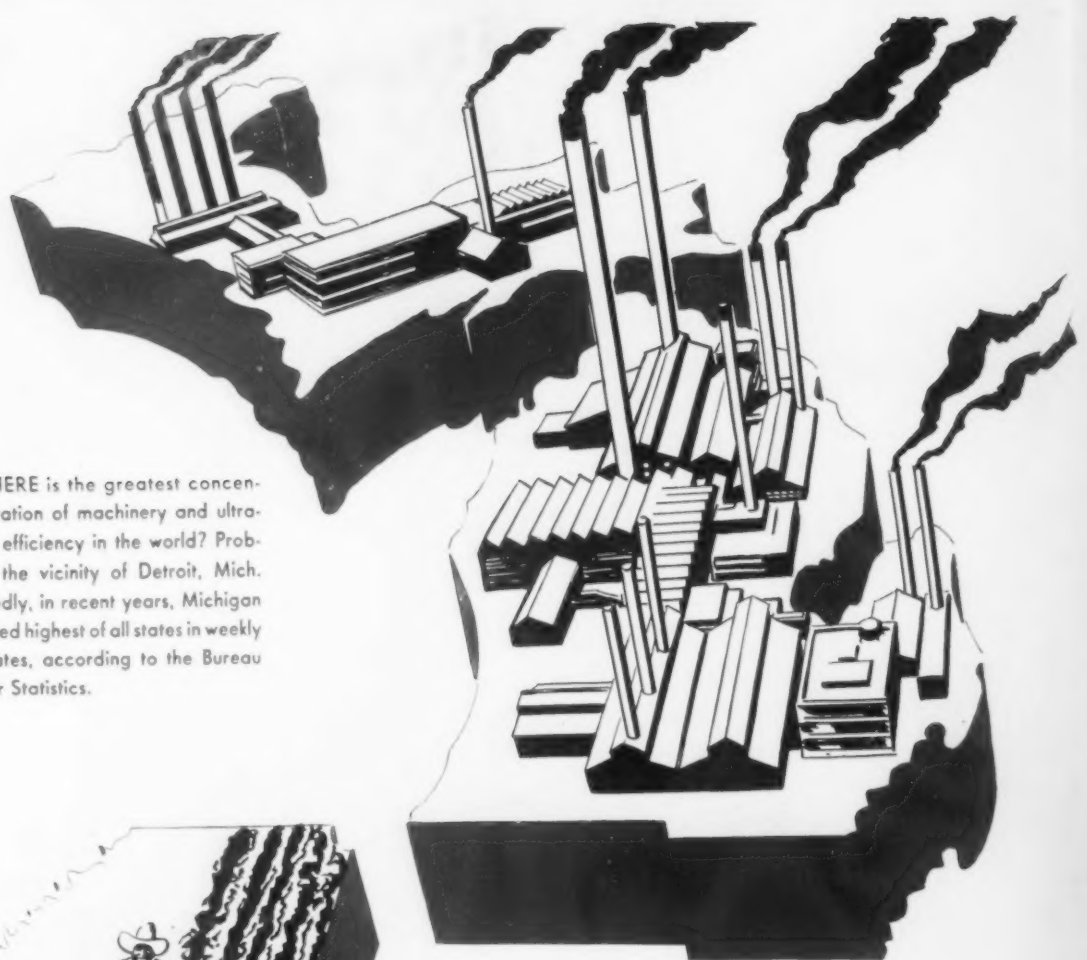


TIME CARD	
John Jones Jr.	
Monday	
Tuesday	9.1
Wednesday	8.4
Thursday	9.8
Friday	9.7
Saturday	10.2
	4.3
TOTAL	51.5



No. 237						
NAME JOHN JONES JR.						
PER PERIOD						
THU	FRI	SAT	SUN	MON	TUE	WED
8s	8s	8s	8s	8s	8s	8s
12.1	12.4	11.1		13.3	15.0	14.1
Total Time 36.8						





WHERE is the greatest concentration of machinery and ultra-modern efficiency in the world? Probably in the vicinity of Detroit, Mich. Repeatedly, in recent years, Michigan has ranked highest of all states in weekly wage rates, according to the Bureau of Labor Statistics.



MISSISSIPPI is one of our least mechanized states. It ranks at the bottom in farms equipped with tractors. Only 1.5 per cent of these farms are tractor powered as compared with the national average of 13.5 per cent. And Mississippi has the lowest per capita income of all of our states.

TAKE it where you will, at home or abroad, there is a definite relationship between the amount of mechanization and the standard of living.

China and India are non-mechanized countries in which manpower tries to do what horsepower in steam, electricity or water should be made to do. Even the most ardent advocates of machine restriction would hate to see us change places with China or India.

Horsepower, mechanization and purchasing power are teammates.

* * *

We have slowed down our national rate of mechanization since 1929. Today, industry is installing new capital equipment at but half the rate that it did 10 years ago. And we cannot hope to afford the luxuries of relief, social security and a huge army of government dependents on the fruits of a "hand made" economy.

The way to solve America's unemployment problem is to put more machines to work. The men will follow. They always have.

Modern

AIR-CRAFT

MADE POSSIBLE BY
MODERN MACHINE TOOLS



MODEL K
UNIVERSAL

American air-craft builders lead the world in standards of dependability, and accuracy. Milwaukee milling machines are an important production tool of "the industry that flies."

KEARNEY & TRECKER CORPORATION
WEST ALLIS STATION MILWAUKEE, WISCONSIN

MORE THAN
40 years
OF DOING
ONE THING WELL



Milwaukee

MILLING MACHINES



THIS WAY TO PROFITS

For ten days, from October 4th to 13th, officers and directors of manufacturing industries, operating executives, engineers, buyers, will converge on Cleveland to see the World's Finest Machine Shop in operation — the Machine Tool Show of 1939.

Every type and kind of machine tool will be shown — hundreds of improvements never before exhibited — machines in full operation — doing in a new and better way the same kind of work that is being done in hundreds of plants throughout the country.

Here the men responsible for production and profits in industry will find how these new machines can help them to maintain earnings in the face of rising costs.

For management depends upon modern machines for production and profits. Labor depends on machines for higher wages and better working conditions. And the public depends on machines for "more goods for more people at lower cost."



**MACHINE TOOL SHOW
OF 1939
CLEVELAND,
OCTOBER 4th TO 13th**



National Machine Tool Builders' Association

10525 CARNEGIE AVENUE, CLEVELAND, OHIO

YOUR SMARTEST INVESTMENT TODAY... MODERN MACHINE TOOLS



*How modern
methods of manufac-
turing and selling have
changed individual
transportation.*



A THOUSAND YEARS OF PROGRESS *- in half a lifetime !*

SCARCELY more than 40 years ago the first motor car chugged its way along a dusty highway. It was an uncomfortable ride, judged by today's standards. Slow, noisy, uncertain, it provided an ideal target for critics of the day.

Yet, this modest ride was the start of a new industry, and one might say, a new civilization. Something great, and new, and different began in the world that day. Since then, as if by the touch of a magic wand, the country roads of our nation have widened into great highways, automobiles and trucks have displaced the horse and buggy, and people everywhere have benefited.

Today, more than six million people directly and indirectly derive their livelihood from the automobile industry.

Today, more than twenty-six million American families ride in a style unmatched by any other country in the world.

Today, with an annual production of three to four million cars a year, automobile prices start at only a few hundred dollars as compared with thousands a few years ago.

How was this accomplished?

Modern manufacturing, engineering, and distribution methods have played the largest part in making these almost unbelievable benefits possible. Engineering research. New machinery. Better distribution methods. Reduced costs. All of these have resulted in the quality vehicles of today.

Chrysler Corporation is proud to have played a part in developing this great industry. In the last fourteen years Chrysler Corporation has built and sold more than 7,000,000 Plymouth, Dodge, De Soto, and Chrysler passenger cars and trucks. Through the engineering, manufacturing and selling of these products it has provided an income, directly or indirectly, for more than 1,000,000 people.

Today, more than ever before, Chrysler Corporation is constantly striving to improve its engineering, manufacturing, and distribution methods in order to be better able to continue to provide the maximum in quality transportation.

★ YOU GET THE GOOD THINGS FIRST ★
FROM CHRYSLER CORPORATION

Chrysler Corporation

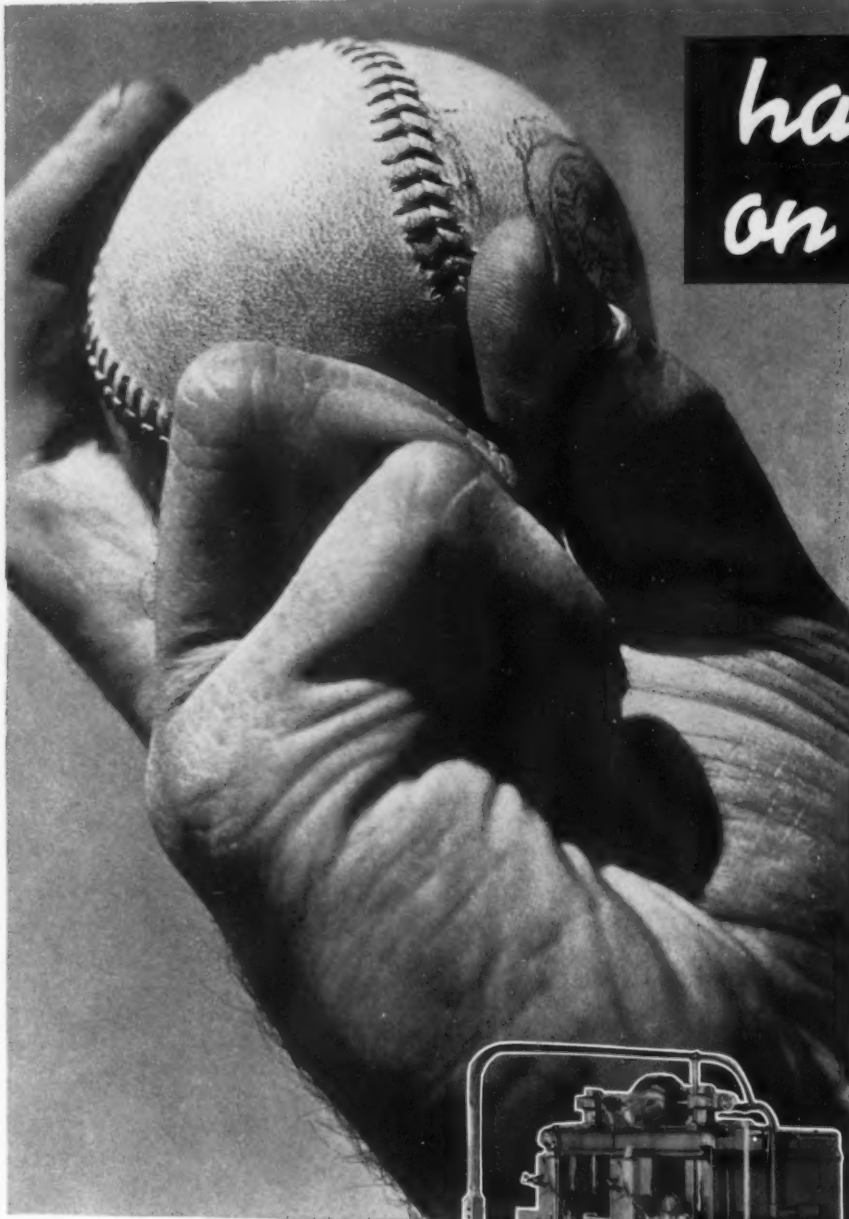
PLYMOUTH • DODGE • DE SOTO • CHRYSLER

Passenger and Commercial Cars

Passenger Cars and Trucks

CHRYSLER MARINE AND INDUSTRIAL ENGINES • AIRTEMP—AIR CONDITIONING

HY-DRAULIC PLANER



*has plenty
on the Ball!*

"Iron man" of heavy production, the Double-Housing Hy-Draulic Planer has everything . . . accuracy, speed, power, stamina; plus Hy-Draulic features. Smoothest worker you ever saw; always fit for the toughest jobs; has "plenty of stuff on the ball" . . .

● Smooth, powerful, shockless Hy-Draulic table drive gives uniform cutting speeds, any desired speed or stroke within the designed range; puts finer finish on work; is easier on tools, machine, operator; has high return ratios. Table can be stopped, inched, or reversed instantly at any point in travel.

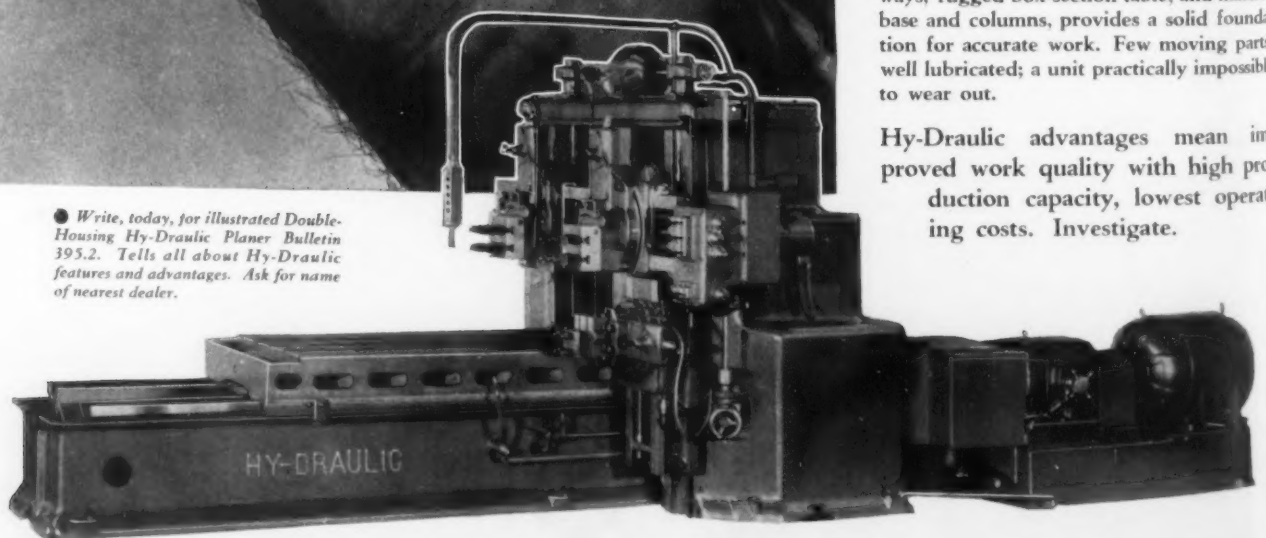
● Hy-Draulic feeds permit infinite selection within the designed range for maximum production in connection with desired cutting speed.

● Standard constant-speed motor, driving hydraulic unit, eliminates power waste of excessive torque, peak loads, braking, and complicated reversing mechanisms.

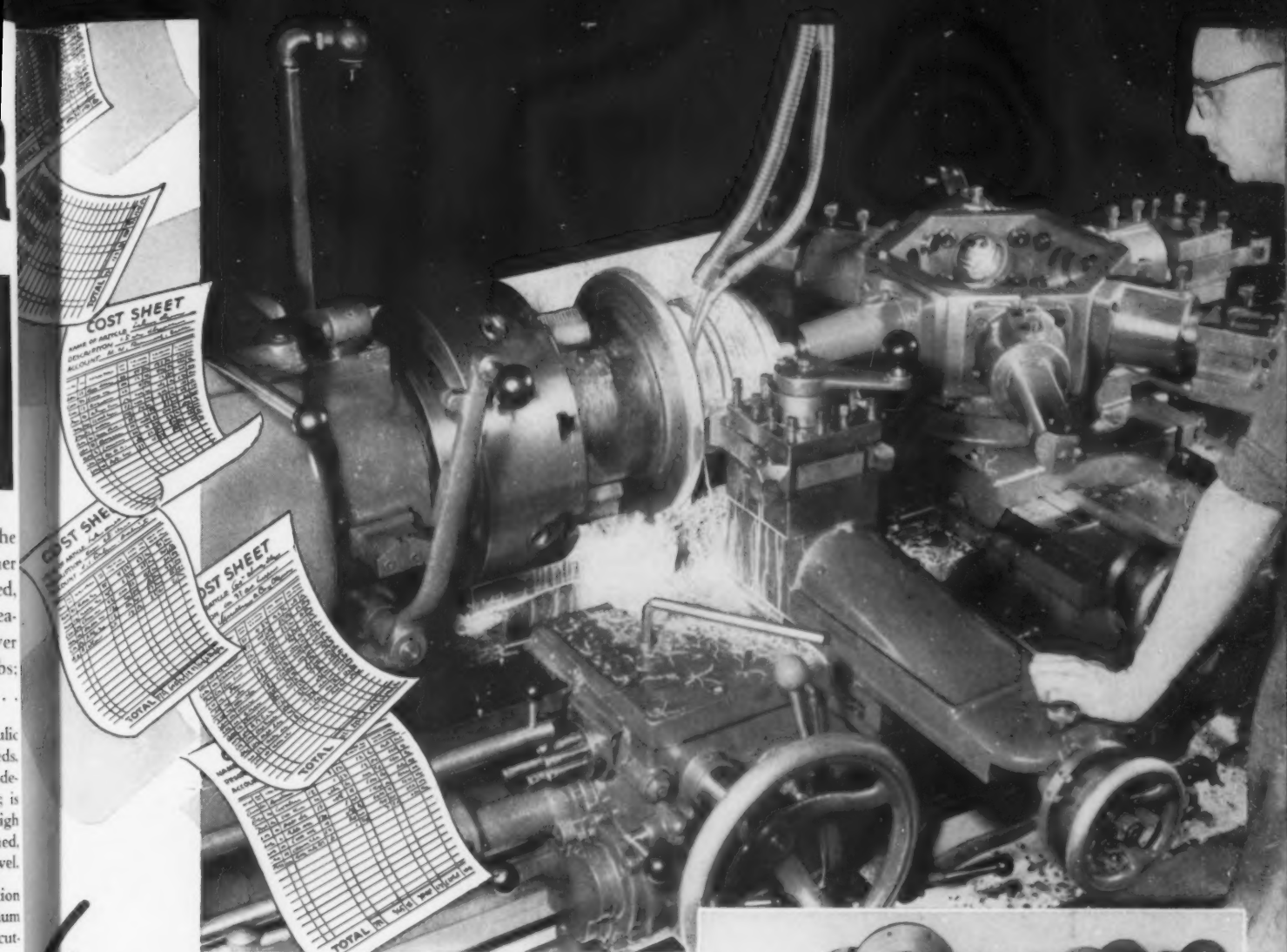
● Highly accurate construction in every operating detail, with generous bearings on ways, rugged box-section table, and massive base and columns, provides a solid foundation for accurate work. Few moving parts, well lubricated; a unit practically impossible to wear out.

Hy-Draulic advantages mean improved work quality with high production capacity, lowest operating costs. Investigate.

● Write, today, for illustrated Double-Housing Hy-Draulic Planer Bulletin 395.2. Tells all about Hy-Draulic features and advantages. Ask for name of nearest dealer.



Hy-Draulic Shapers.. Planers.. Slotters.. Shaper-Planers
ROCKFORD MACHINE TOOL CO.
ROCKFORD, ILLINOIS, U.S.A.



Watch the Cost Sheets!

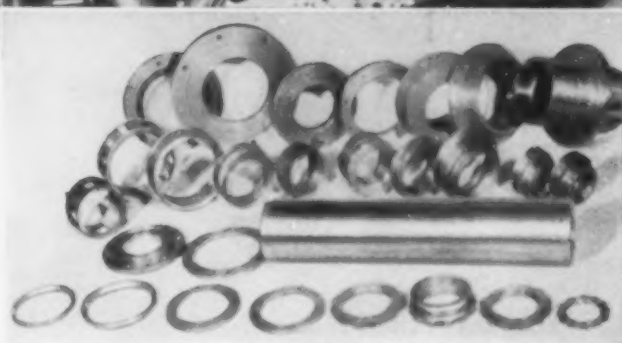
... see how much money GISHOLTS Save on these small lot jobs—

When this manufacturer reviewed his cost sheets on the parts machined on his new Gisholt 2L High Production Turret Lathe, he found that machining costs on miscellaneous parts had been reduced more than 50%. Here are a few typical examples:

MACHINING PARTS IN LOTS OF 8 PIECES

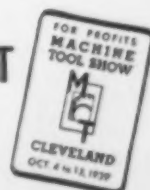
	Time on old machine	Time on new Gisholt	Total Time Saved	Money Saved
Part No. 1—Side Bearing & Cover.....	53 Hrs.	26 Hrs.	27 Hrs.	\$46.48
Part No. 2—Pitman end thrust collar...	36½ Hrs.	20½ Hrs.	16 Hrs.	27.52
Part No. 3—Inner race bearing collar..	33 Hrs.	14 Hrs.	19 Hrs.	32.72

These savings were made despite the adherence to extremely close tolerances. But such savings are not at all unusual for these new Gisholts with the sturdy cross-feeding hexagon turret which permits multiple cutting and greatly reduces cutting time. A Gisholt engineer can help you make such savings.



★ In making many parts like these, boring cuts are taken from the hexagon turret while other operations such as turning, facing and grooving are taken from the square turret. Facing operations may also be taken from the hexagon turret by merely feeding the turret across the work. Gisholt standard tools, tool holders and boring bars were used on this work.

Visit the
GISHOLT EXHIBIT
at the
Machine Tool Show



"YOUR SMARTEST INVESTMENT TODAY—BETTER MACHINE TOOL"



GISHOLT

MACHINE COMPANY

1215 EAST WASHINGTON AVENUE, MADISON, WISCONSIN, U. S. A.

AUTOMATIC LATHES • TOOL GRINDERS • BALANCING MACHINES

A Great Debt

We have a great inheritance in the past fifty or more years of mechanical pioneering and development. In this period much was done by those who immediately preceded us and to them we owe a lasting debt.

Let us prove we are worthy stewards of this heritage by carrying high the torch of progress and passing on to our successors a greater benefit than we received.

No greater challenge can come to this generation than to improve the means by which our American standard of living is made possible.

Above all, let us not dally by the roadside or quarrel over what has been committed to us. To do so will destroy what others have worked so diligently to create for us.

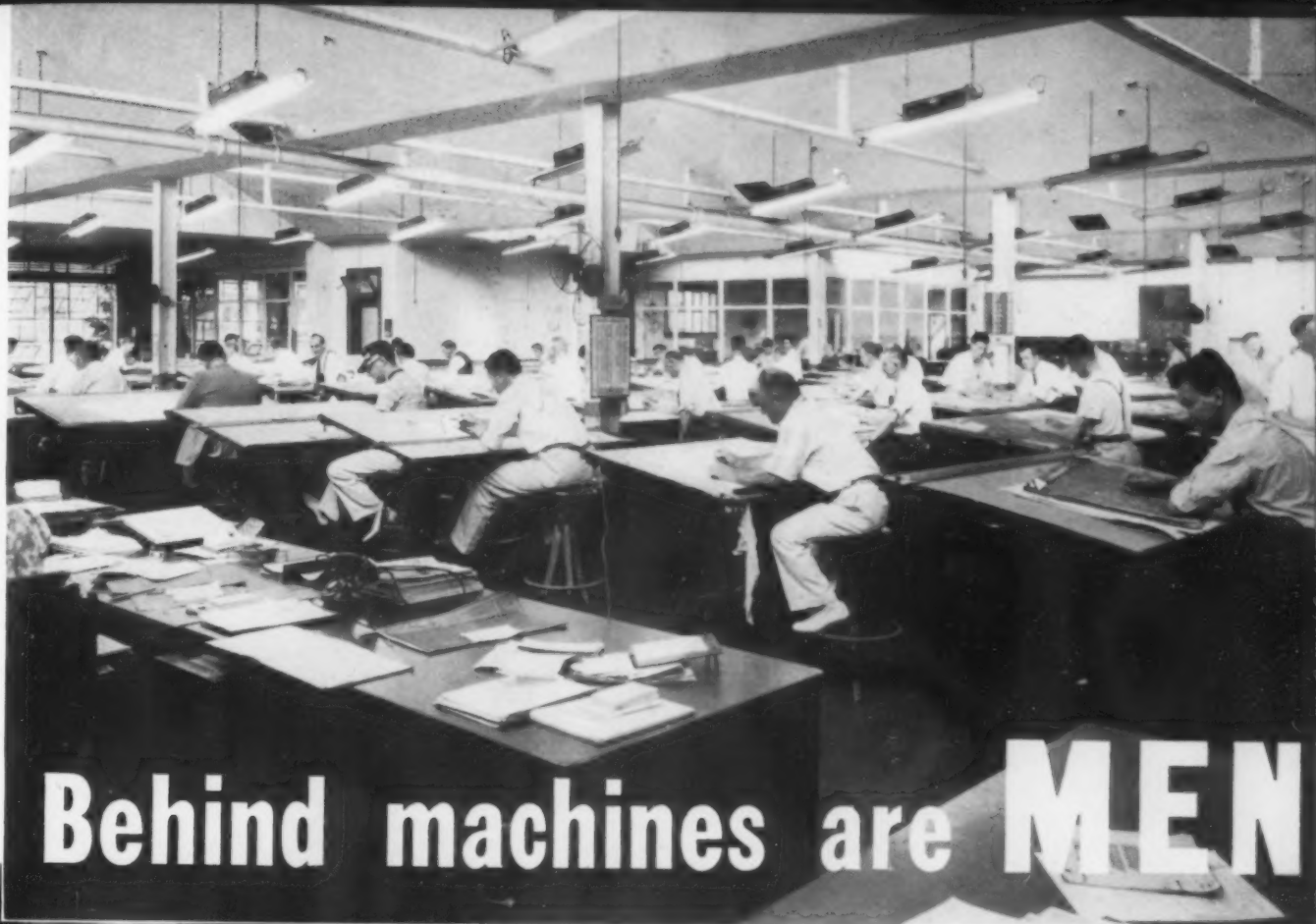
THE LUCAS MACHINE TOOL COMPANY

Makers of the LUCAS "Precision" Horizontal Boring, Drilling & Milling Machine



CLEVELAND, OHIO

Bullard
Engineers
make de-
tailed cost
and produc-
tion studies
for manu-
facturers
who wish to
know how
Multi-Au-
Matics can
reduce their
costs. They
are at your
service.

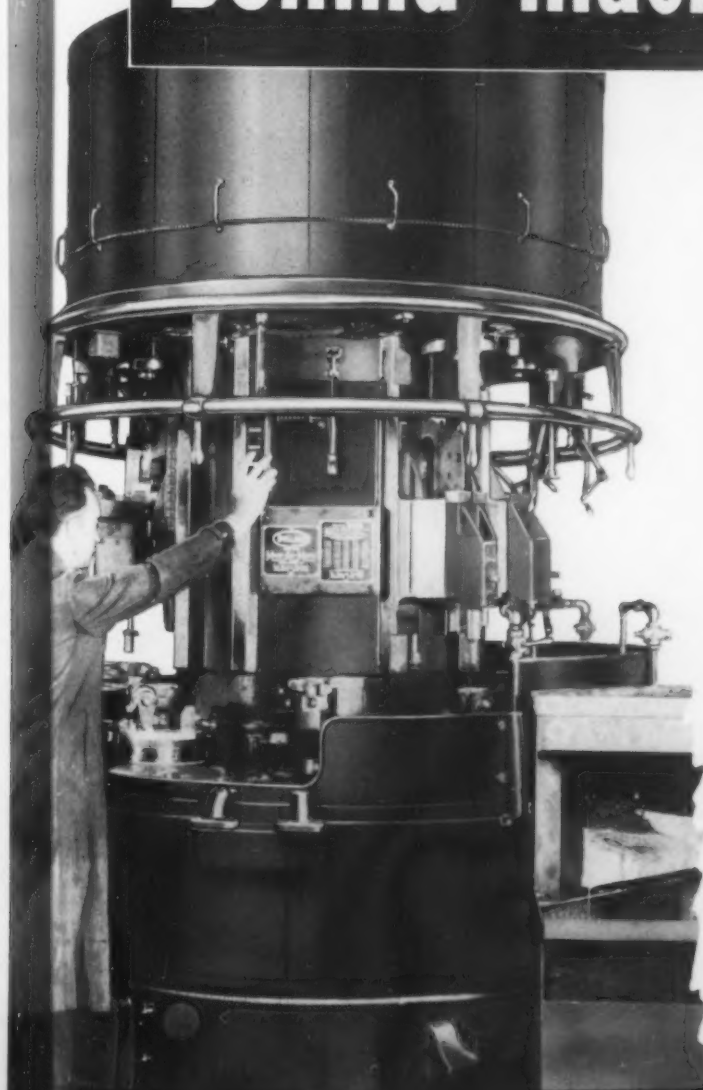


Behind machines are **MEN**

Machine Tools build **jobs** as well as products. These engineers and draftsmen are continually at work refining and improving Bullard Multi-Au-Matics. They could not be built without foundry-men, machinists, tool-makers, assemblers, crane men, and hundreds of other supplementary jobs.

Thus at the same time that Multi-Au-Matics are reducing manufacturing costs, they are helping to create dozens, scores, often hundreds of other jobs—jobs that would never exist except for the broadened market tapped by the lower prices at which they make it possible for your finished product to be sold.

Multi-Au-Matics do more than reduce your costs; they help create more, bigger, better jobs—permitting you to do your part in solving the unemployment problem.



THE BULLARD COMPANY
BRIDGEPORT, CONNECTICUT



PJ Cooperation!

Potter & Johnston are proud of the extent to which the United Aircraft Corporation employs their Automatic Chucking and Turning Machines for the successful manufacture of the famous Pratt & Whitney Wasp Engines and Hamilton Standard Propellers. One P & J feature, which is both valuable and important, is the practical cooperation offered to the customers' manufacturing engineers and executives—a tangible asset which accompanies every P & J Automatic.

Your requests for sample production data and recommendations are invited.

**POTTER & JOHNSTON
MACHINE COMPANY**
Pawtucket, R. I.

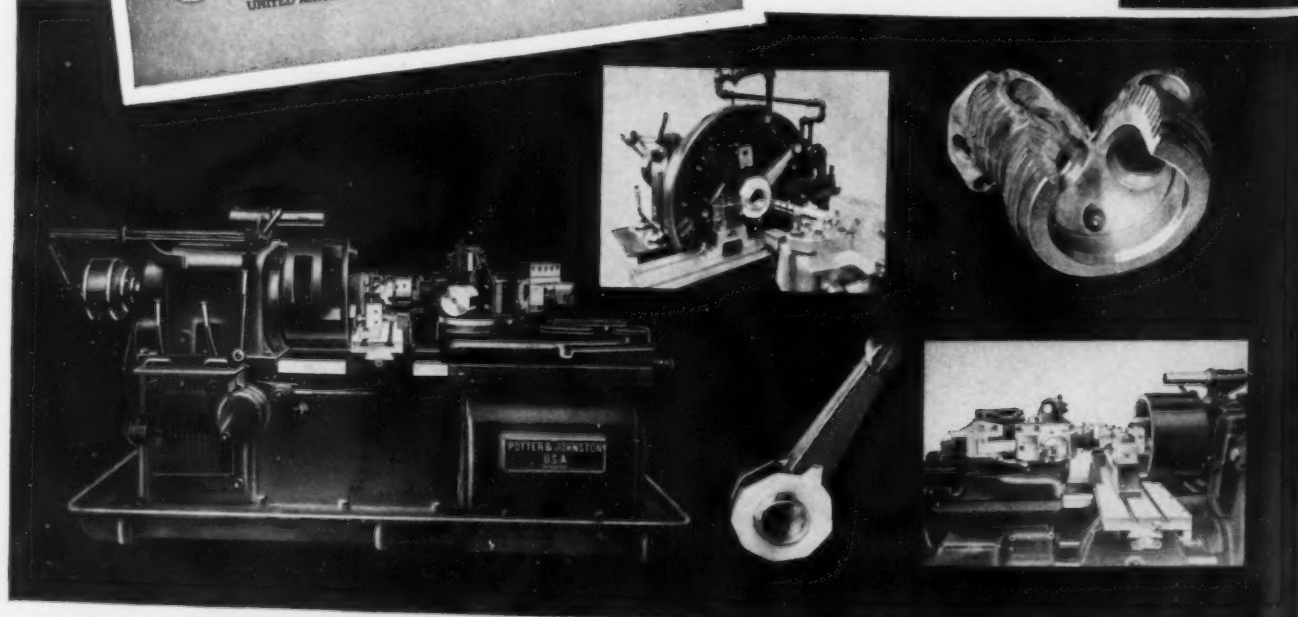
FACTORY REPRESENTATIVES:

William L. Martin, Headquarters at Factory: New England States and Eastern New York and New Jersey; A. W. Stone, 286 Kenyon Ave., Plainfield, N. J.; Western New York and New Jersey, Eastern Pennsylvania, Maryland and Delaware: G. Tell Duflois, 8-154 General Motors Building, Detroit, Michigan; Michigan and the City of Toledo, Ohio: Louis K. Voelke, 14014 Woodworth Road, East Cleveland, Ohio; Ohio—with the exception of Toledo, and Western Pennsylvania: Harry I. Schuster, 743 N. Fourth St., Milwaukee, Wisconsin; Illinois, Missouri, Wisconsin, Iowa and Indiana: **AGENCIES:** Star Machinery Company, 1741 First St., South Seattle, Washington; Henes-Morgan Machinery Co., 2026 Santa Fe Ave., Los Angeles, Calif.; Jenison Machinery Co., 20th and Tennessee Sts., San Francisco; Wessendorf, Nelms & Co., Inc., 320 Franklin Ave., Houston, Tex.; Arthur Jackson Machine Tool Co., 60 Front St., West, Toronto 2, Ontario; Arthur Jackson Machine Tool Co., 437 Grosvenor Ave., Montreal, Canada; Burto Griffiths & Co., Ltd., Birmingham, England; R. S. Stokvis et Fils, Paris, France; Rotterdam, Holland and Brussels, Belgium; Maskinaktiebolaget Karlebo, Stockholm 1, Sweden; Ing. Ercole Vaghi, Milano, Italy; Yamatake & Co., Ltd., Tokyo, Japan; Imperial Export Co., 44 Whitehall St., New York, N. Y.; Almacoa, Zurich, Switzerland; Be-Te-Ha Warshaw, Poland; Schuchardt et Schutte, Budapest, Hungary; Bourla Freres, Istanbul, Turkey.

Honors for the Army
WITH A WASP-POWERED LOCKHEED

This year the Collier Trophy goes to the U.S. Army Air Corps for its brilliant work with the XC-38, first successful pressure cabin airplane in the world. Designed for subatmosphere operation under severe ranges of temperature and atmospheric conditions, this pioneering Lockheed is powered by dependable Pratt & Whitney Wasp engines.

PRATT & WHITNEY AIRCRAFT
One of the four divisions of
UNITED AIRCRAFT CORPORATION, EAST HARTFORD, CONNECTICUT






... Maintaining
HIGH
PRODUCTION
..... and Keeping Costs Low

—that's why users of
production milling
machines depend on
Brown & Sharpe Cutters
... both Stock and Special



 Write for Catalog 33— Brown & Sharpe Mfg. Co.
Providence, R. I. U. S. A.

BROWN & SHARPE



EXTRACTS

from the ravings of a maniac!

Quote—"I do not want to use a production machine. I want to do everything by hand; it costs more and besides I like to labor for small wages and pay high prices for everything I buy."

Unquote—That's the reason he is a maniac.

THE HALL PLANETARY COMPANY

Builders of Precision Production Milling Machines

FOX ST. & ABBOTSFORD AVENUE

PHILADELPHIA, PENNSYLVANIA

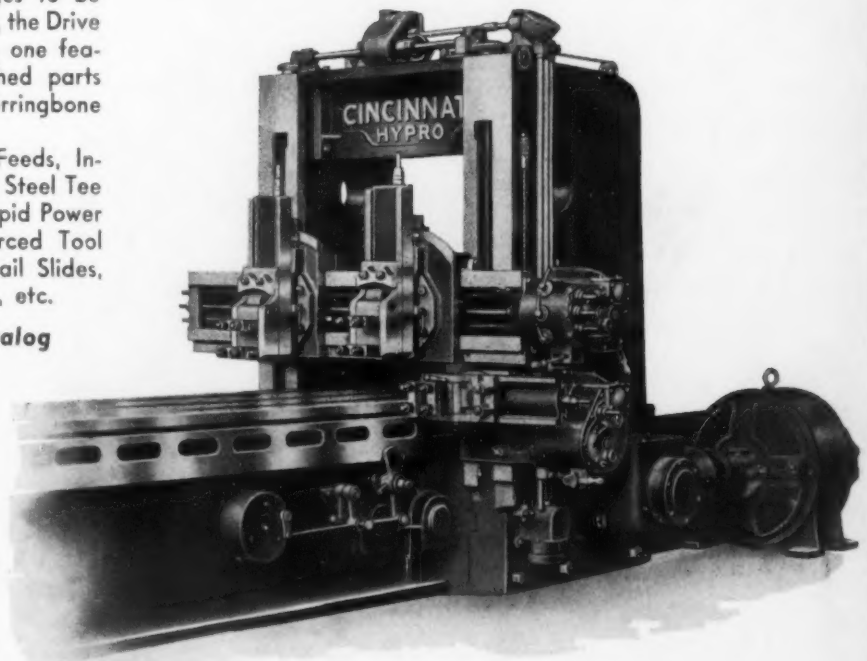


HERRINGBONE DRIVE PROVIDES SMOOTH FINISH

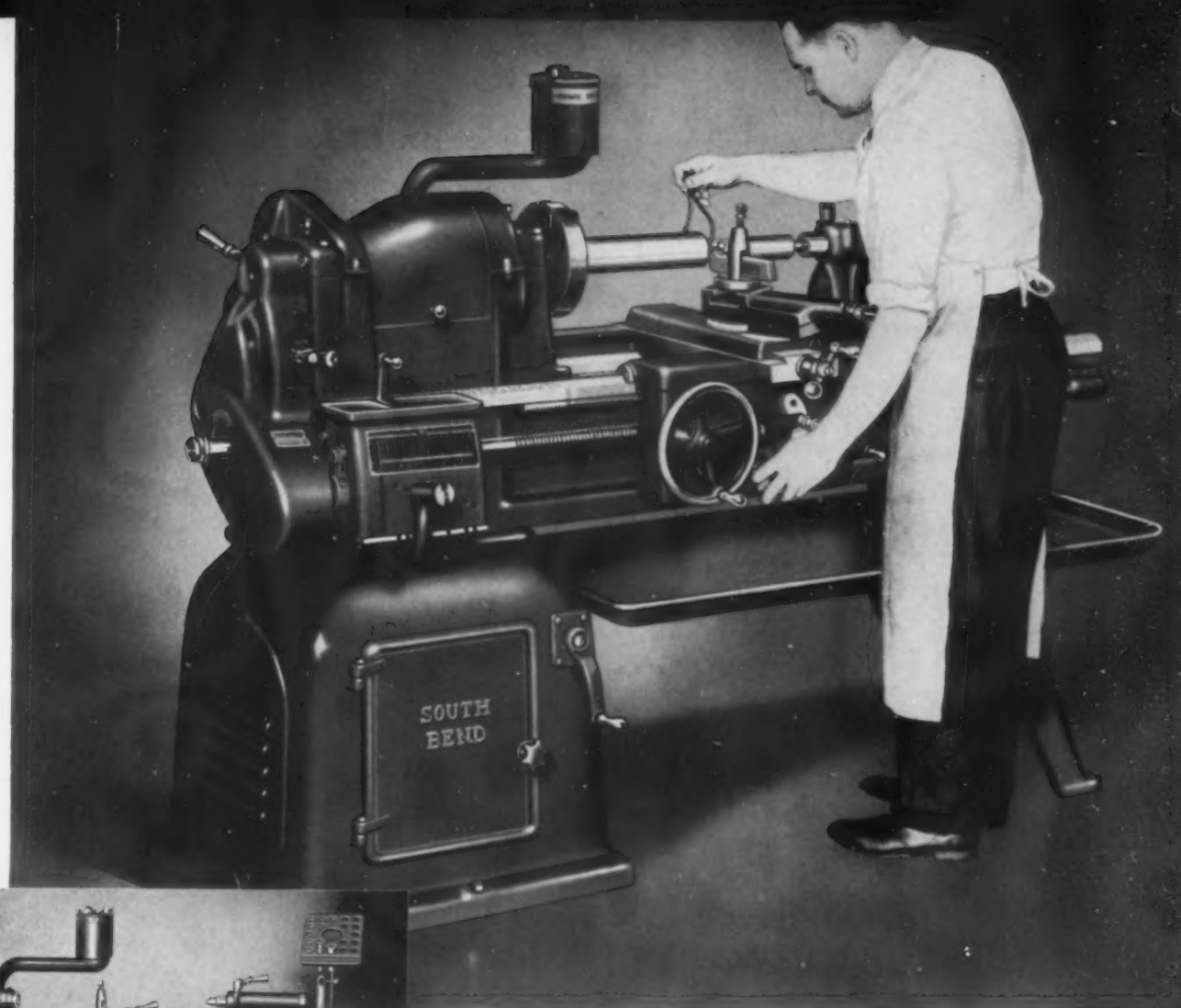
Among the numerous advantages to be found in Cincinnati Hypro Planers, the Drive feature is outstanding. It is the one feature which permits smooth finished parts through the use of a complete herringbone balanced gear train.

Other features: Selective Dial Feeds, Instantaneous Rail Lift, Renewable Steel Tee Slots, Independent Feeds and Rapid Power Traverse to the Heads, Reinforced Tool Block Abutment, Inverted Dovetail Slides, Massive Pyramid Type Housings, etc.

Write for Complete Catalog



The Cincinnati Planer Co. — Cincinnati, Ohio, U. S. A.



16" x 6' South Bend Underneath Motor Driven Lathe

SOUTH BEND LATHES

"A Modern Lathe at a Reasonable Price"

South Bend Back-Geared Screw Cutting Precision Lathes are made in five sizes: 9", 11", 13", 14½" and 16" swing. Each size is made in several bed lengths; standard and quick change gear types; with motor drive or countershaft drive. Write for General Catalog No. 98.

On Display in Principal Cities

Popular sizes of South Bend Lathes are carried in stock for immediate delivery and demonstration by machinery dealers in 477 of the principal cities of the world. A few prominent distributors displaying South Bend Lathes are listed below. Write for name of our dealer nearest you.

Boston, Mass.
The MacKenzie Machinery Co.
Buffalo, N. Y.
J. L. Osgood Machinery & Tool Co.
Chicago, Illinois
C. B. Burns Machinery Co.
Cleveland, Ohio
Reynolds Machinery Co.
Detroit, Mich.
Lee Machinery Co., Inc.
London, E. I., England
Buck & Hickman, Ltd.
Los Angeles, Calif.
Eccles & Davies Machinery Co.
Milwaukee, Wis.
W. A. Voell Machinery Co.

Newark, N. J.
I. E. Edwards Machinery Co.
New York, N. Y.
A. C. Colby Machinery Co.
Philadelphia, Pa.
W. B. Rapp, Machinery
Pittsburgh, Pa.
Tranter Manufacturing Co.
Providence, R. I.
Geo. T. Reynolds & Son, Inc.
San Francisco, Calif.
Moore Machinery Co.
Seattle, Washington
Star Machinery Co.
Toronto, Ontario, Canada
A. R. Williams Mach'y Co., Ltd.

South Bend Lathe Works
590 E. Madison St. South Bend., Ind., U.S.A.



9-inch 1" Collet Capacity South Bend Underneath Motor Driven Precision Bench Lathe

SOUTH BEND LATHE WORKS

Lathe Builders Since 1906



THE STAGE IS SET!

October 4 marks the opening of another MACHINE TOOL BUILDERS SHOW in Cleveland. Products of machine tool manufacturers from coast to coast will be exhibited there. It is the show of the machine tool world. Don't fail to be on hand to see the latest in "AMERICAN" equipment at Cleveland!

WE CORDIALLY INVITE YOU TO **SEE**

THE WORLD'S SMALLEST ³WAY BROACHING MACHINE

IN OPERATION AT **BOOTH 5104**

AMERICAN BROACH & MACHINE COMPANY

ANN ARBOR, MICHIGAN, U. S. A.

BROACHING MACHINES, PRESSES, BROACHING TOOLS, SPECIAL MACHINERY



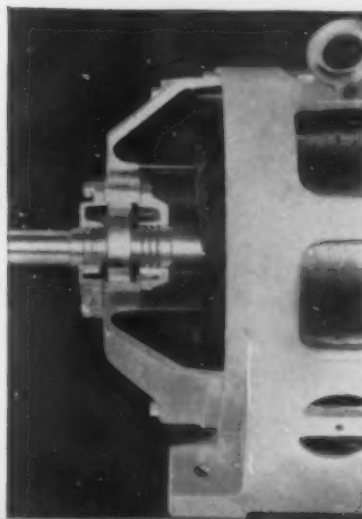


VACUUM IMPREGNATION

TWO FEATURES

exclusive with Crocker-Wheeler

**BUILD LONGER LIFE
into
GENERAL PURPOSE MOTORS**



LUBRICANT SEAL



Crocker-Wheeler Motors in new Toiletries Plant of Campana Sales Co., near Batavia, Ill.

TYPICAL of Crocker-Wheeler pioneering and engineering are two construction features found in no other line of general purpose motors.

Vacuum Impregnation is commonly used in the construction of transformers, underground cables and other electrical apparatus, where it is vital to effect complete protection from dirt, oil and moisture. Crocker-Wheeler uses this process in the building of general purpose motors because it is the only process which eliminates the personal element in workmanship and offers complete assurance that all parts of the windings will be thoroughly insulated.

The patented frictionless *Lubricant Seal* for ball bearing motors prevents dust or other foreign matter from entering, and grease from leaking out of, the bearing housing. Many Crocker-Wheeler motors have run 5, 7 and even 10 years without the grease being changed.

WRITE FOR LITERATURE

Crocker-Wheeler makes a full range of squirrel cage and slip-ring motors. We would like to send you Bulletin No. 250 which describes in detail all the important construction features of Crocker-Wheeler A. C., Polyphase, Induction Motors. Please write on your business or professional letterhead for this Bulletin.



Write for illustrated data folders on any of the lines listed below

CROCKER-WHEELER

POLYSPEED MOTORS

1 TO 7½ HP.

DIRECT CURRENT MOTORS

¾ TO 5,000 HP

POLYPHASE INDUCTION MOTORS

¾ TO 10,000 HP.

SYNCHRONOUS MOTORS

15 TO 10,000 HP.



50 YEARS OF PIONEERING

DIRECT CURRENT GENERATORS

UP TO 7,500 KW.

ALTERNATING CURRENT GENERATORS

UP TO 10,000 K.V.A.

MOTOR-GENERATOR SETS

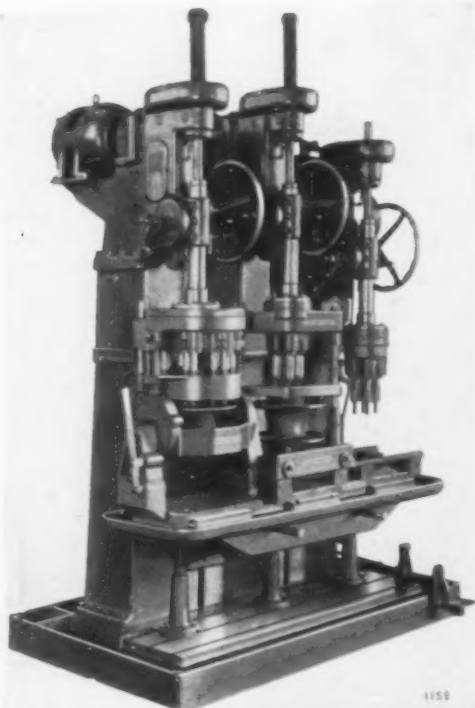
UP TO 7,500 KW.

FLEXIBLE COUPLINGS

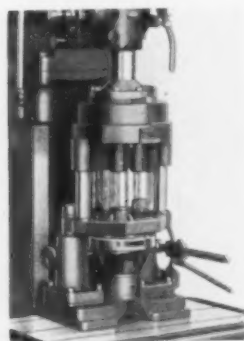
UP TO 200 HP.

CROCKER-WHEELER ELECTRIC MFG. COMPANY, AMPERE, NEW JERSEY

Economical High-Production Drilling



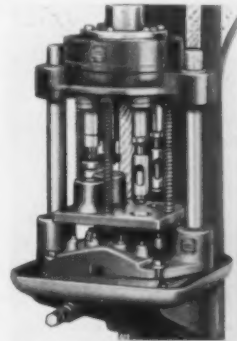
Our Self-Oiling All-Geared and Hydram Drilling Machines can be used singly, in Gangs, or combined in High Production Units to secure most economical high production on drilling, reaming, tapping and similar operations. Shown at left is a simple 3-spindle No. 210 Gang Drill with Box Column and Auxiliary Multi-Spindle Heads. Below are close-ups of three different single-spindle Self-Oiling All-Geared Drilling Machines each having Multi-Spindle Heads for operations described. Additional applications practically unlimited. Investigate! Write today for Catalog I 3910.



This Unit, with Multi-Spindle Head and Quick-Acting Fixture, drills 11 holes simultaneously in cast aluminum part for a leading washing machine. Write for details and data.



Another 11-spindle Head. This one is for tapping malleable iron. Roll-over jig speeds production, adds to convenient operation. Let us quote on your work.



Counterboring, countersinking, and tapping; in two cast-iron work-pieces at the same time is the job of our No. 210 shown above. Ask about other set-ups.

BARNES DRILL CO.

815-831 CHESTNUT STREET
ROCKFORD, ILLINOIS, U. S. A.

MARVEL SAWS

**YOU
CAN'T bite them off!**

Automatic Production Saws are essential to modern living because steel rods, bars, beams and angles are necessary parts of today's homes, heating plants, automobiles, stoves, refrigerators, cleaners . . . of innumerable things that make up modern life.

Restrict the use of machine tools and you restrict living standards. Steel must be cut; you can't bite it off; and proud, machinery-loving American workmen can never be forced to waste their time in needless, fruitless hand sawing of the Asiatic type for the coolies' wages such methods can support.

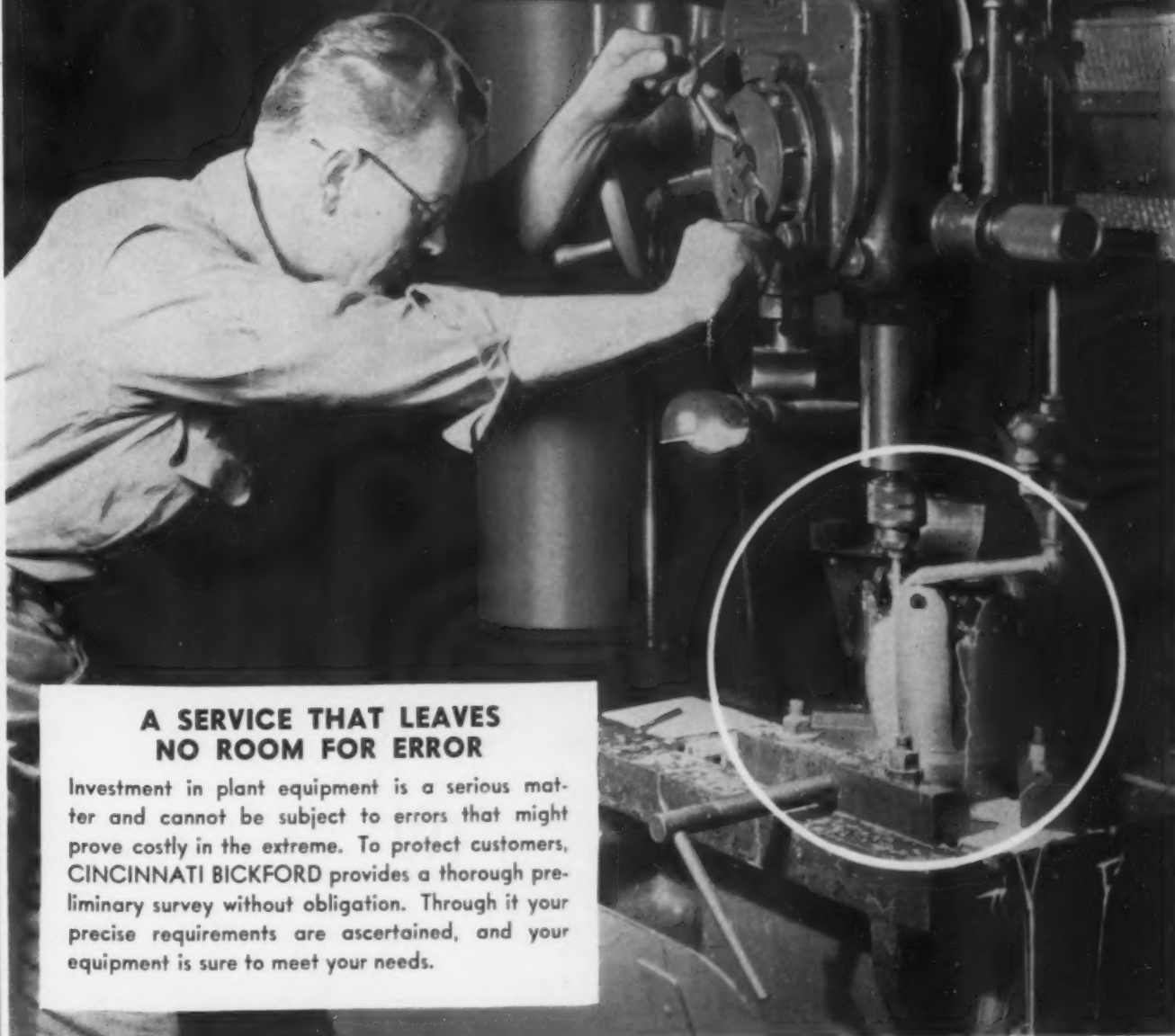
Give us more automatic machine tools, make each faster and more productive than the last, for only on such a basis can we build the greater American prosperity with more of everything for everybody.

ARMSTRONG-BLUM MFG. CO. "The Hack Saw People"
5749 Bloomingdale Ave., Chicago, U. S. A. Eastern Sales: 199 Lafayette St., N. Y.

"25% FASTER—and Easier to Operate"

HIGH-SPEED — ALL GEARED SUPER SERVICE RADIAL DRILL

In service at the Houston, Texas, Plant of the *Reed Roller Bit Company*, manufacturers of rotary drilling tools for oil and mineral prospecting fields, this CINCINNATI BICKFORD Radial has won high praise for its fast, easy performance. Shown at work on a K K Core Bit Head, of 6" inside diameter, and 8" length, drilling slush holes 1/2" in diameter, and 4" deep at the rate of 180 per hour. Like every SUPER SERVICE Radial, all control is within easy reach of the operator, and speed is graded by geometric progression completely preventing duplication or overlapping.



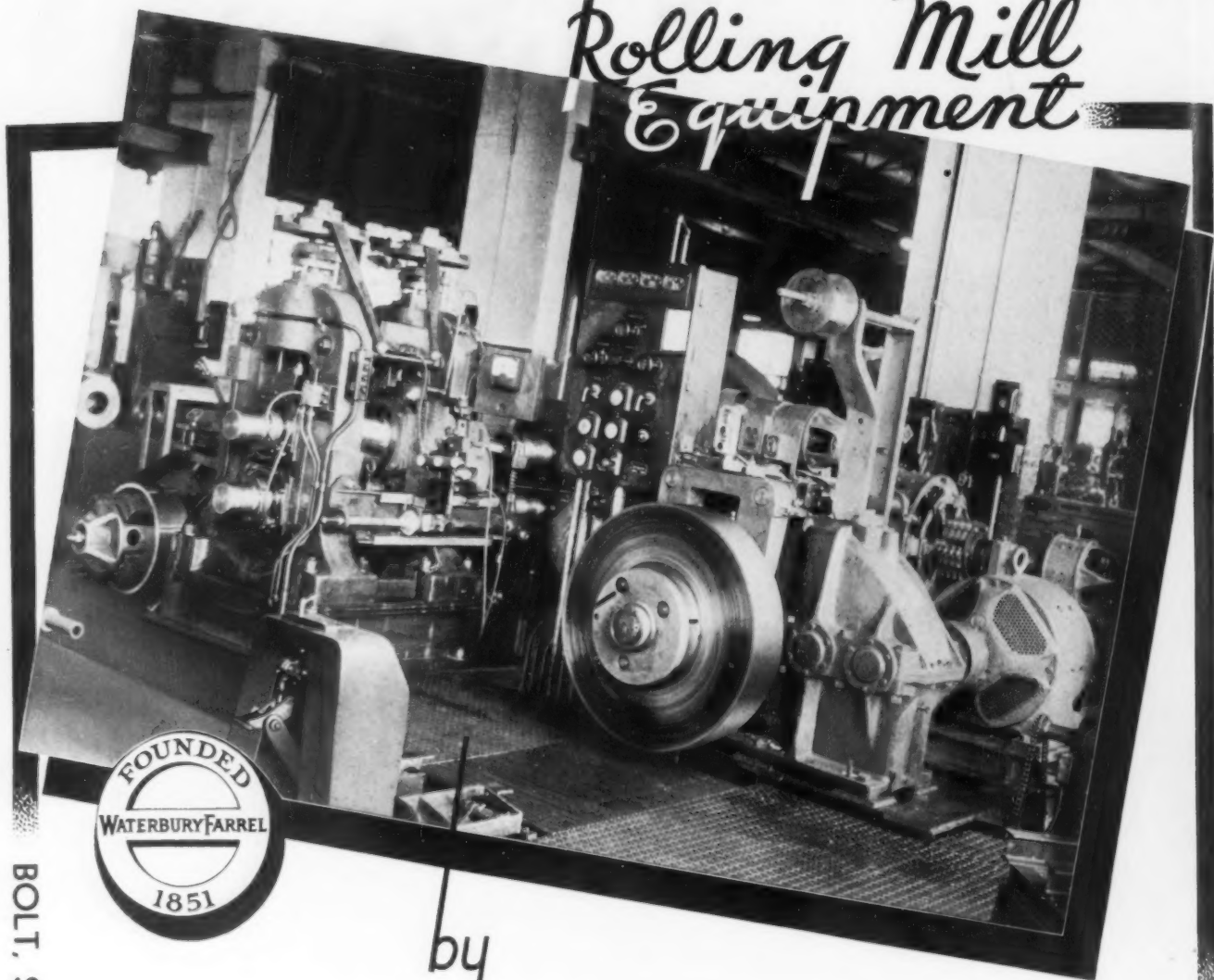
A SERVICE THAT LEAVES NO ROOM FOR ERROR

Investment in plant equipment is a serious matter and cannot be subject to errors that might prove costly in the extreme. To protect customers, CINCINNATI BICKFORD provides a thorough preliminary survey without obligation. Through it your precise requirements are ascertained, and your equipment is sure to meet your needs.

THE CINCINNATI BICKFORD TOOL CO.
OAKLEY, CINCINNATI, OHIO, U. S. A.



Rolling Mill Equipment



BOLT, SCREW AND NUT MACHINERY

by

WATERBURY - FARREL

This machine helps to create many jobs for pressmen, tool-makers and others — more jobs than were ever displaced by its time-saving ability.

A modern 13" x 16" Cold Strip Finishing Mill in the Wallingford Steel Co.'s plant, Wallingford, Connecticut. Speeds from 200 to 600 feet per minute on steel strip up to 10" wide. The Automatic Adjustable Tension Drum Winder with power stripper, provides constant tension on the strip from start to finish; it will accommodate coils up to 1500 pounds.

● TUBE, SHEET AND WIRE MACHINERY ● POWER PRESSES, ETC. ●

WATERBURY FARREL
FOUNDRY & MACHINE COMPANY
WATERBURY • CONNECTICUT • U.S.A.

CLEVELAND

CHICAGO

NEWARK, N. J.

NATCO HOLESTEEL Heavy Duty Multi-Drillers

Shown at the right is a large HEAVY DUTY NATCO HOLESTEEL Vertical Adjustable Multi-Driller. It is built of a steel column and base and a large adjustable joint drive head arranged with a semi-automatic hydraulic feed. This machine was furnished with twelve heavy duty adjustable spindles.

NATCO HOLESTEEL Vertical machines are built in a variety of sizes and capacities ranging from five to fifty horsepower. They may be furnished as desired with a single spindle head, a fixed center multiple spindle head for high production work, or an adjustable multi-spindle head as shown. Such a driller may be arranged for an unlimited number of set-ups which is ideal for a shop handling a variety of jobs.

A variety of spindle speeds may be had by the use of pick off change gears, and a selective gear change mechanism in the neck. In addition, the adjustable multi-spindle heads are provided with patented NATCO high and low speed spindles.

NATCO HOLESTEEL machines are of simple sturdy design and are flexible. They are easy to operate . . . and will stand up against hard usage over long periods with very little maintenance expense. Write for complete descriptive literature or . . . call a NATCO representative. Let him aid you in coming to a practical solution of your "hole" problems.



THE NATIONAL AUTOMATIC TOOL CO.
Richmond, Indiana, U. S. A.

Chicago Office, 2009 Engineering Bldg.
Detroit Office, 409 New Center Bldg.

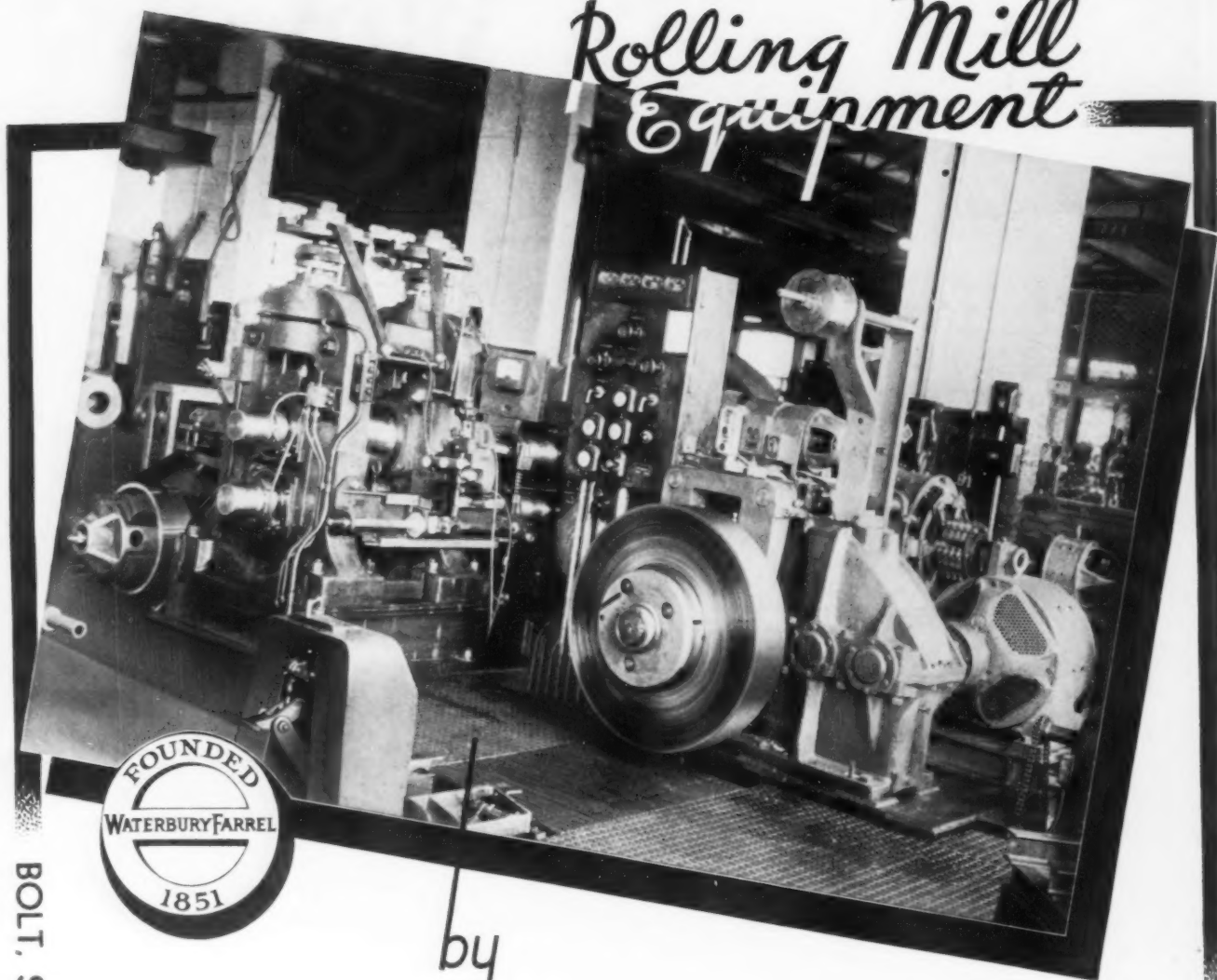
NATCO

DRILLING, BORING and TAPPING MACHINES
SOLVES YOUR "HOLE" PROBLEM

NATCO Advanced Engineering
Plus Quality Construction
Recognized For Many Years
The World Over

Investigate
NATCO Methods for
the Lowest Possible
Hole Costs!

Rolling Mill Equipment



BOLT, SCREW AND NUT MACHINERY



by

WATERBURY - FARREL

This machine helps to create many jobs for pressmen, tool-makers and others — more jobs than were ever displaced by its time - saving ability.

A modern 13" x 16" Cold Strip Finishing Mill in the Wallingford Steel Co.'s plant, Wallingford, Connecticut. Speeds from 200 to 600 feet per minute on steel strip up to 10" wide. The Automatic Adjustable Tension Drum Winder with power stripper, provides constant tension on the strip from start to finish; it will accommodate coils up to 1500 pounds.

● TUBE, SHEET AND WIRE MACHINERY ● POWER PRESSES, ETC. ●

WATERBURY FARREL
FOUNDRY & MACHINE COMPANY
WATERBURY • CONNECTICUT • U.S.A.

CLEVELAND

CHICAGO

NEWARK, N. J.

NATCO HOLESTEEL Heavy Duty Multi-Drillers

Shown at the right is a large HEAVY DUTY NATCO HOLESTEEL Vertical Adjustable Multi-Driller. It is built of a steel column and base and a large adjustable joint drive head arranged with a semi-automatic hydraulic feed. This machine was furnished with twelve heavy duty adjustable spindles.

NATCO HOLESTEEL Vertical machines are built in a variety of sizes and capacities ranging from five to fifty horsepower. They may be furnished as desired with a single spindle head, a fixed center multiple spindle head for high production work, or an adjustable multi-spindle head as shown. Such a driller may be arranged for an unlimited number of set-ups which is ideal for a shop handling a variety of jobs.

A variety of spindle speeds may be had by the use of pick off change gears, and a selective gear change mechanism in the neck. In addition, the adjustable multi-spindle heads are provided with patented NATCO high and low speed spindles.

NATCO HOLESTEEL machines are of simple sturdy design and are flexible. They are easy to operate . . . and will stand up against hard usage over long periods with very little maintenance expense. Write for complete descriptive literature or . . . call a NATCO representative. Let him aid you in coming to a practical solution of your "hole" problems.



NATCO Advanced Engineering
Plus Quality Construction
Recognized For Many Years
The World Over

Investigate
NATCO Methods for
the Lowest Possible
Hole Costs!

THE NATIONAL AUTOMATIC TOOL CO.
Richmond, Indiana, U. S. A.

Chicago Office, 2009 Engineering Bldg.
Detroit Office, 409 New Center Bldg.

NATCO

DRILLING, BORING and TAPPING MACHINES
SOLVES YOUR "HOLE" PROBLEM

TIME-SAVING MACHINES

*Produce Pay Envelopes
and Dividend
Checks*

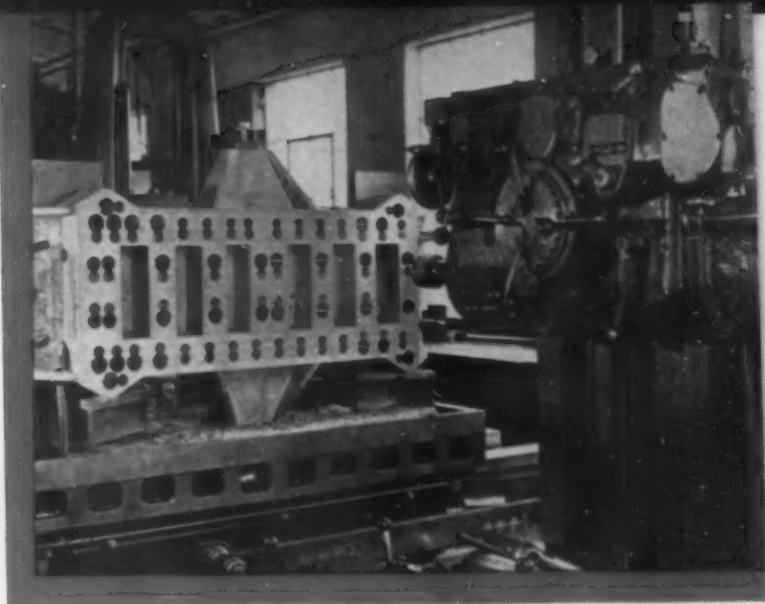
The record shows that when time-saving machines are being used to the fullest extent—the days are marked as a period of prosperity all around. You can't save time with obsolete machines. You must use time-savers in order to reflect the time-savings in lower prices to expand sales and fill more pay envelopes.

As a time-saver the G & L Horizontal Boring, Drilling and Milling Machine stands high in its class. It's a high-power, precision machine. That means smoother and truer finished surfaces at faster speeds and feeds.

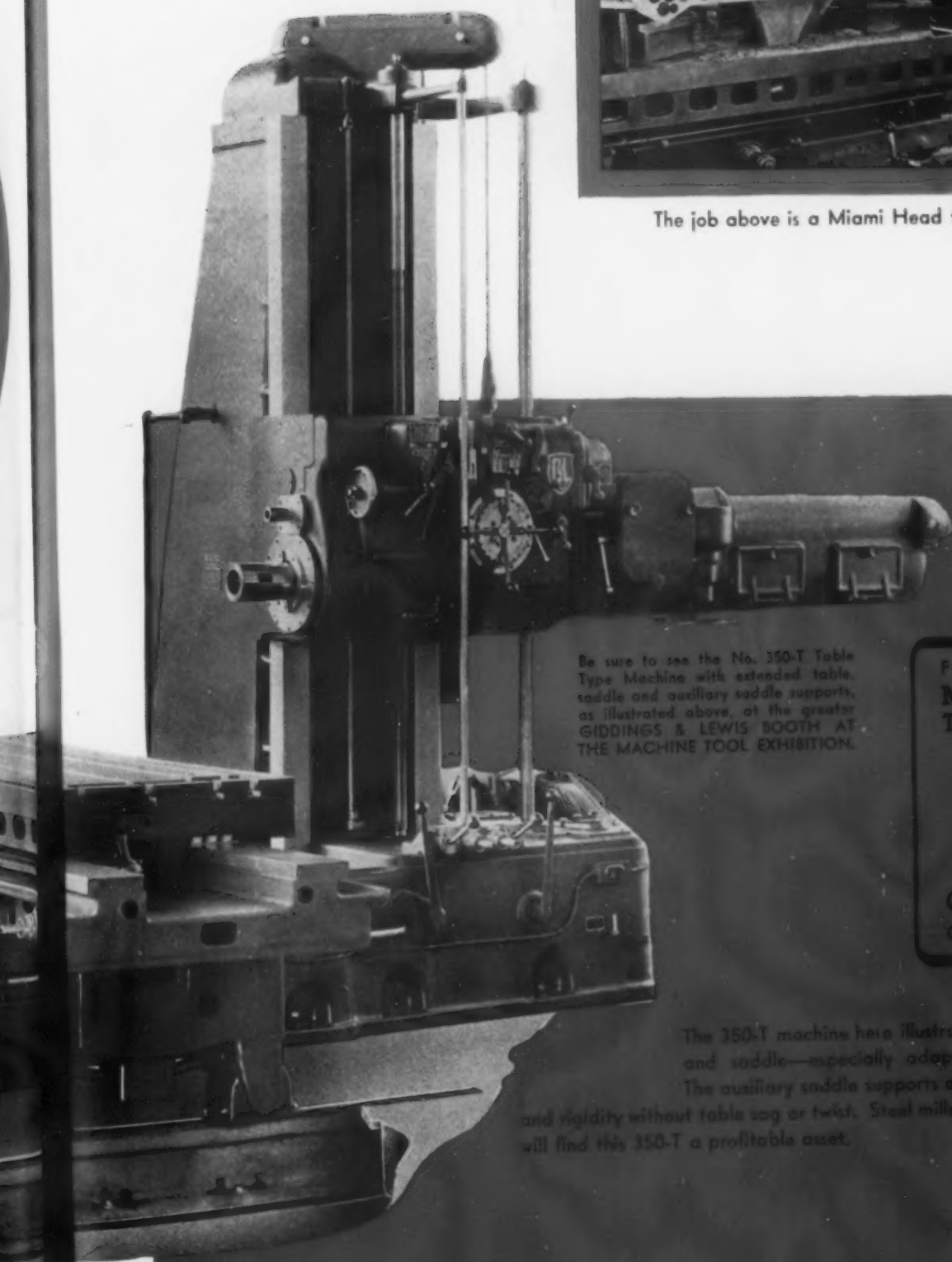
It also saves "setting up" time. Locating multiple centers accurately, similar to the operations illustrated, is a quick and easy job on the G & L. Add to your time-savings with G & L precision machines!



GIDDINGS & LEWIS
FOND DU LAC



The job above is a Miami Head for Multiple Drill Press.



Be sure to see the No. 350-T Table Type Machine with extended table, saddle and auxiliary saddle supports, as illustrated above, at the greater GIDDINGS & LEWIS BOOTH AT THE MACHINE TOOL EXHIBITION.

FOR PROFITS
**MACHINE
TOOL SHOW**

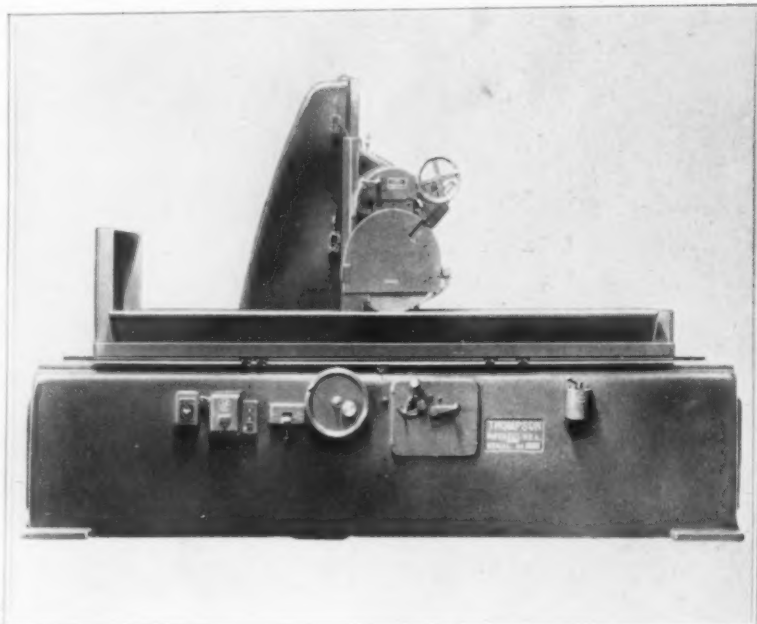


CLEVELAND
OCT. 4 to 13, 1939

The 350-T machine here illustrated has an enlarged table and saddle—especially adapted for massive castings. The auxiliary saddle supports assure a maximum of range and rigidity without table sag or twist. Steel mills and builders of machinery will find this 350-T a profitable asset.

MACHINE TOOL CO.
MILWAUKEE WISCONSIN

More Jobs THROUGH TIME-SAVING!



Industrial records show that time-savings make possible more sales through price reductions, and hence more jobs.

The Thompson Hydraulic Surface Grinder saves time by its table speed of 100 feet per minute without shock or dwell; by automatic wheel truing; by its automatic hydraulic wheel-head feed possessing wide range; and by vibrationless construction and refinements in design which make high speed operation successful.

And as a plus value, these grinders produce a finer finish and accurate results. Built in various sizes to suit your type of work. Write for detailed description.

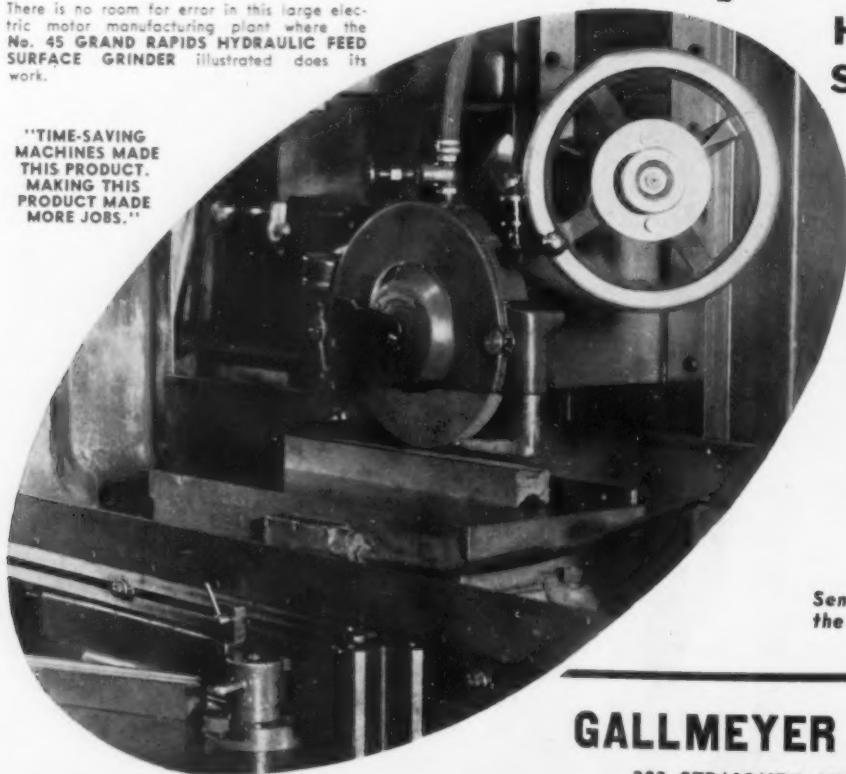
THE THOMPSON GRINDER COMPANY ★ ★ SPRINGFIELD, OHIO

BUILT FOR SERVICE

Grand Rapids

There is no room for error in this large electric motor manufacturing plant where the No. 45 GRAND RAPIDS HYDRAULIC FEED SURFACE GRINDER illustrated does its work.

"TIME-SAVING
MACHINES MADE
THIS PRODUCT.
MAKING THIS
PRODUCT MADE
MORE JOBS."




HYDRAULIC FEED SURFACE GRINDERS

That the present GRAND RAPIDS line leads in its field is shown by the preference it receives where constant operation with tough alloys under high-speed production schedules requires equipment that will do *more* than just a good job—and do it steadily. Your own needs will be best fulfilled by the correct GRAND RAPIDS GRINDER. This grinder has the smooth high speed that you need to do the finest accurate work.

Send for the new catalog GL-100 illustrating the latest in hydraulic feed surface grinders.

GALLMEYER & LIVINGSTON CO.

303 STRAIGHTY AVE., S.W. GRAND RAPIDS, MICHIGAN



☆

How to make a "Watch Bearing" for 1000 whirling tons

☆

Problem: How to finish one of the world's largest cast-iron thrust bearings, 105 inches in diameter, to make it support the whirling bulk of a 2,000,000 pound turbo-generator impeller and rotor with a minimum of friction, vibration and wear?

Answer: Carborundum Sales Engineers, in collaboration with the manufacturer of this generator, specified the correct procedure. First, tool marks were removed from the casting with a definitely graded Carborundum Brand Silicon Carbide surface-grinding wheel. Then the bearing surface was smoothed and polished with successively smaller sizes of standard Carborundum Brand Abrasive Grain, using wood and lead laps. The result was a highly polished, perfectly uniform surface that today is helping make one of the world's largest hydro-electric generators run like a watch. This is one more example of the effective manner in which Carborundum Engineering Service and Carborundum Brand Products combine to solve both the usual and unusual grinding problems in every industry.

AN INVITATION TO EXECUTIVES CONCERNED WITH MANUFACTURING

Whatever you make, there are two ways in which The Carborundum Company's Abrasive Service can help your company. Highly trained abrasive engineers are ready to help solve any special grinding or finishing problem that may confront you. Also, without obligation, they will study your present abrasive set-up, report on its efficiency, and wherever possible, indicate how production can be improved or savings effected. Write to The Carborundum Company, Niagara Falls, N. Y., and a representative will call.

SEE THE CARBORUNDUM EXHIBIT, BOOTH 2225,
MACHINE TOOL SHOW, CLEVELAND, OCTOBER 4-15, 1949

CARBORUNDUM
TRADE MARK
ABRASIVE PRODUCTS



FOR ACCURACY AND ECONOMY IN MANUFACTURE



...JOBS MEAN BREAD *and Modern Machine Tools Create JOBS*

As better machine tools are developed and placed in use by industry, more and better jobs are created.

For example, not so many years ago the mechanical refrigeration industry was literally unknown. By 1924 it boasted 31,700 employees. When the last figures became available, the number was 56,784. This employment is nearly twice as much as required in the manufacture of ice. Yet ice dealers more than doubled in the period from 1920 to 1930.

Without modern machine tools, the mechanical refrigeration industry would still be practically unknown. Prices would be prohibitive were it not for the interchangeability of parts. And this interchangeability is completely dependent upon the accuracy of the modern machine tool—particularly the grinding machine.

LANDIS



Then too, some of the efficiency of the modern mechanical refrigerator goes back to the accuracy of the grinding machine. A Landis 10" x 18" Type C Plain Hydraulic Grinder, in the plant of a well-known refrigerator manufacturer, is turning out eccentric shafts on a production basis within a limit of .00004". This limit is equal to one-fortieth the thickness of a cigarette paper.

This one example indicates in a small way just how the modern machine tool multiplies jobs over a period of time, thereby creating employment and a higher all around standard of living for all. To maintain this standard or to make it still higher, the job creating possibilities of machine tools must be fully utilized. There is no substitute.

TOOL COMPANY WAYNESBORO, PENNA.



BOR I Z E

ON HEALD BORE-MATICS

for Precision

.0002" spacing

maintained on Heald No. 47A Bore-Matic in precision turning nine teeth on pump rotors. Accumulative error for spacing of all nine teeth does not exceed .0002".

for Production

300% Increase

obtained over previous methods by precision finishing large pump bodies on Heald No. 42 Bore-Matic. Eleven surfaces bored, faced, turned, chamfered and grooved on this machine.

for Profits

75% Savings

Effect of precision boring bearing seats in both ends of machine tool workhead body on Heald No. 49 Double End Bore-Matic. Tolerances held to .0002" for size and straightness and .0005" for alignment.



See the entire HEALD Line
at the Cleveland Show Oct. 4-13

THE HEALD MACHINE CO. Worcester, Mass. U. S. A.



For Economical Cutting-Off . . .

Norton Resinoid Bonded Wheels

CUTTING-OFF and slotting are now real production jobs and the Norton Resinoid Cut-off Wheel is a real production tool. In many plants where careful records are kept this wheel shows the lowest cost per cut. It also reduces the amount of stock lost in machining and finishes the cut so well that in many cases subsequent machining is not necessary.

For many wet cutting operations and for jobs where a minimum of burr is desired there are also Norton rubber bonded cut-off wheels. Norton engineers are available to study your cut-off jobs and recommend the correct wheels.

NORTON COMPANY, WORCESTER, MASS.

New York Chicago Detroit Philadelphia Pittsburgh
Hartford Cleveland Hamilton, Ont. London Paris
Wessling, Germany Corsico, Italy

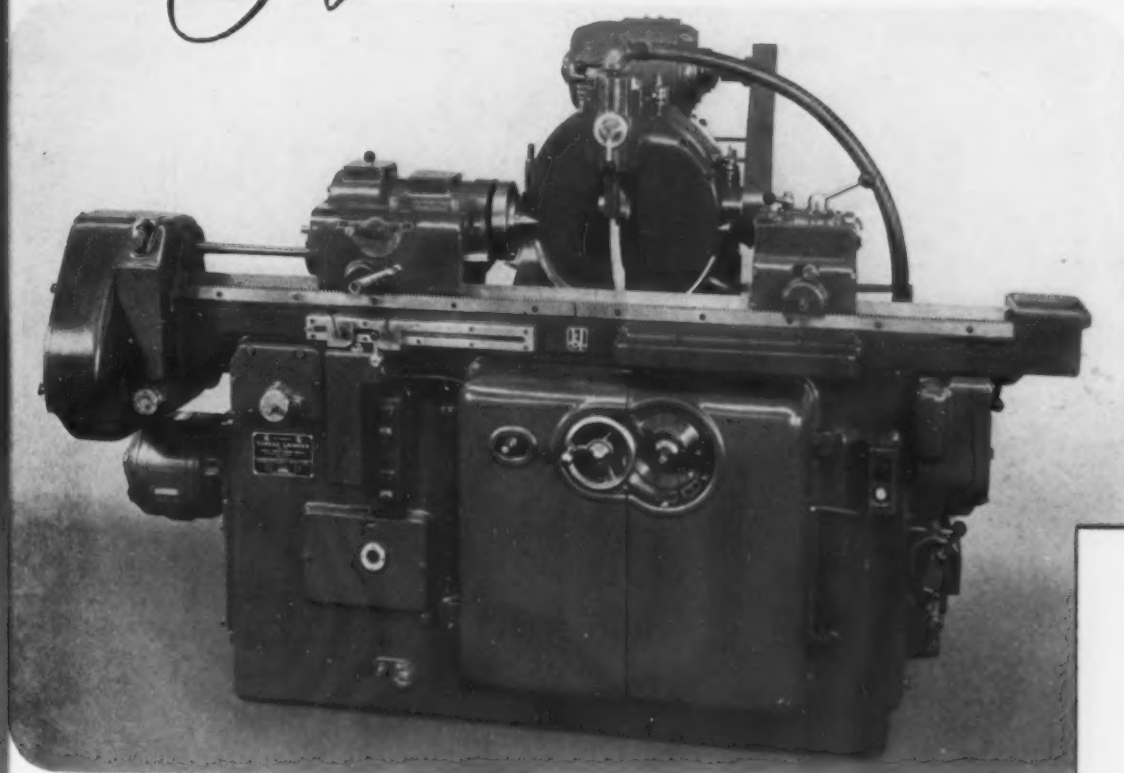
W-708

NORTON ABRASIVES

A U T O M A T I C

Spells

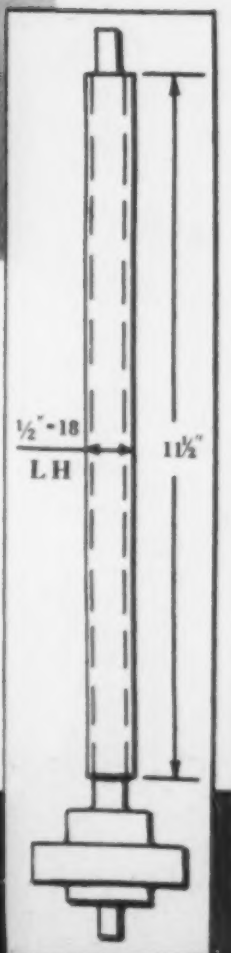
CONTINUOUS PRECISION ON
PRODUCTION THREAD GRINDING



THE lead screw, shown here, is a typical example of the precision work produced on the Jones & Lamson Automatic Thread Grinding Machine. The manufacturer of this part has used his J&L Thread Grinder for 12 hours or more a day for the past 16 months — yet lead accuracy on this piece has been maintained at .0002" over the entire thread length of 11½ inches. The production is 1.34 threaded parts per hour from the solid.

The AUTOMATIC FEATURES of the J&L Thread Grinder make this sustained production possible. Possible because standard equipment includes — AUTOMATIC dressing of the grinding wheel, AUTOMATIC compensation for the amount dressed off the wheel, and AUTOMATIC in-feed of the wheel on successive cuts so that a thread is completed in one setting of the work — the in-feed stops AUTOMATICALLY when size is reached. These AUTOMATIC features allow one operator to run more than one J&L machine on jobs of this type, with consequent increase in hourly production.

Jones & Lamson's 20 years of thread grinding experience may be invaluable in solving some of your precision threading problems — recommendations on methods and equipment are yours for the asking.



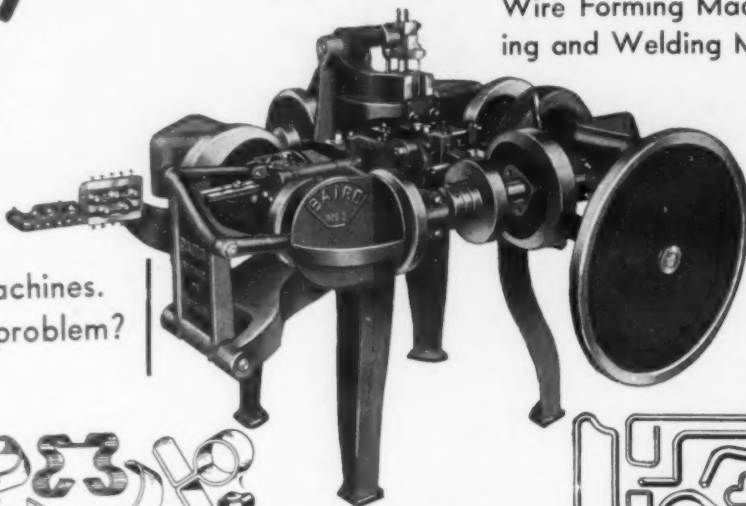
THREAD TOOL DIVISION OF
JONES & LAMSON MACHINE COMPANY
SPRINGFIELD, VERMONT, U. S. A.



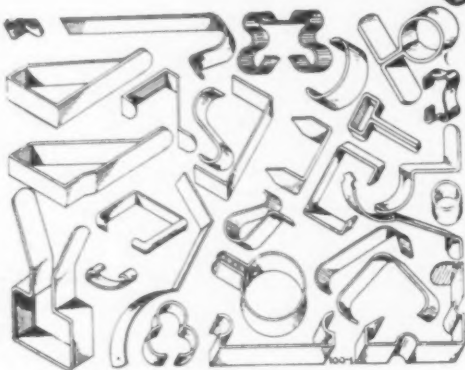
BAIRD PRODUCTION MACHINES

Reduce costs of goods, enabling more people to buy and the increased demand makes more work and more jobs mining and rolling metal or drawing wire, etc. from which to make the goods.

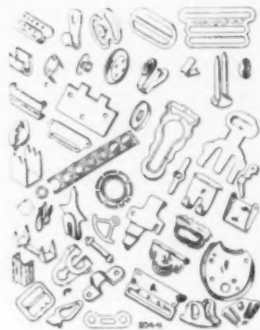
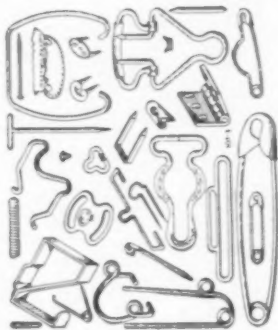
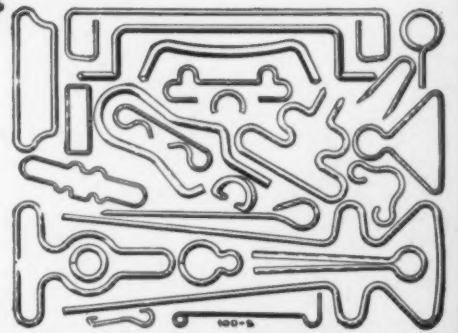
Ribbon Metal
Forming
Machines.
Special High
Production Machines.
What is your problem?



Wire Forming Machines. Wire Forming and Welding Machines. Machines to make chain, clips, fasteners, pins, hinges, hangers, buttons, buckles, thumb-tacks, bails, hair-pins, safety pins, springs, etc.



The articles shown opposite illustrate some forms made on BAIRD Four Slide Wire and Ribbon Metal Forming Machines as shown above.



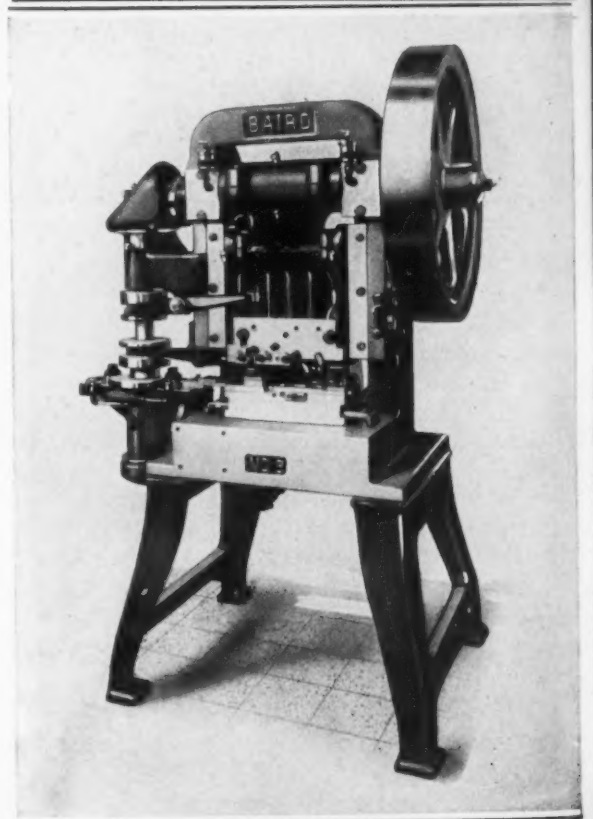
Foot Presses

Automatic Open Back Presses

- " Pillar Presses
- " Single Transfer Presses
- " Multiple Transfer Presses
- " Tandem Presses
- " Special Presses
- " Machinery Since 1846

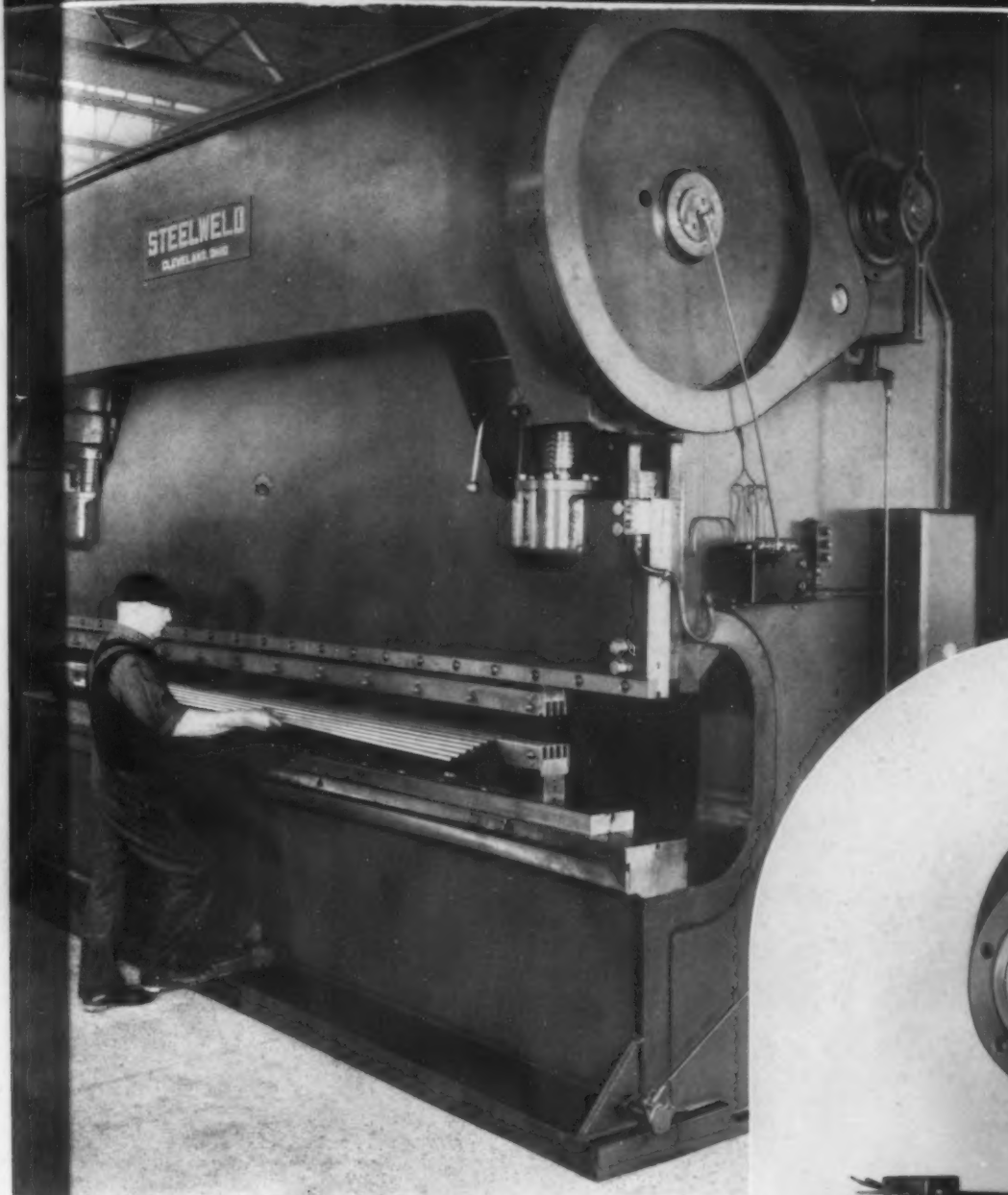
"Ask BAIRD About It"

**THE BAIRD MACHINE CO.
BRIDGEPORT, CONNECTICUT**

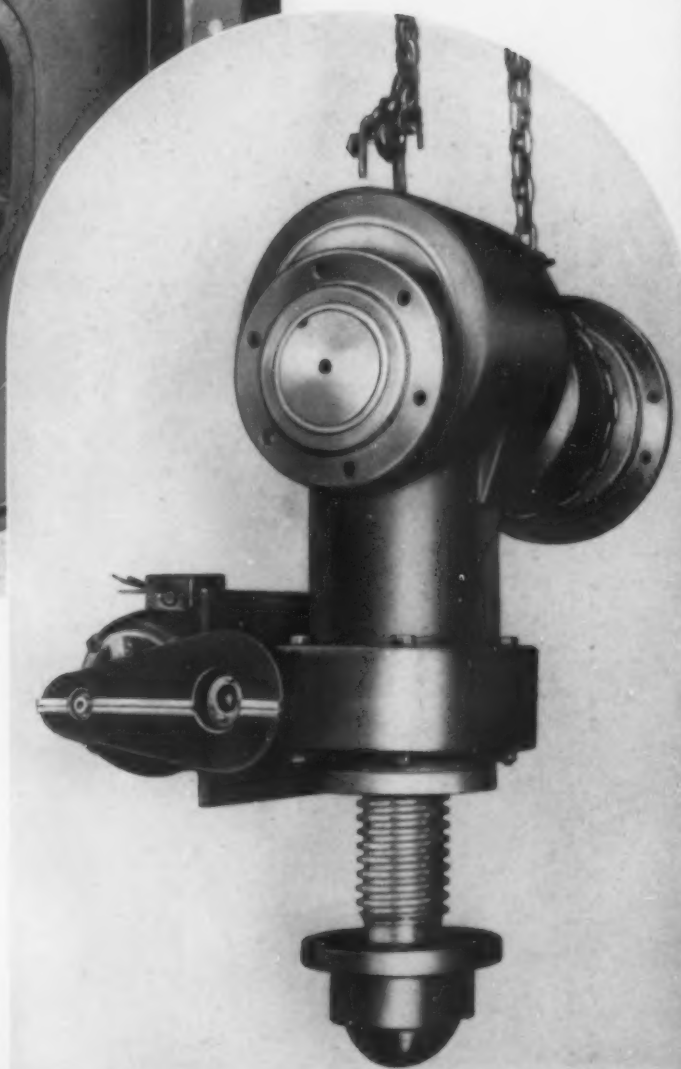


A Baird Multiple Transfer Press

STEELWELD *Bending Presses*



(Left) View of Steelweld Model K Production Brake.
(below) One of its eccentric and main bearing assemblies.



Dependable performance in bending, forming and blanking is an outstanding factor in low cost production.

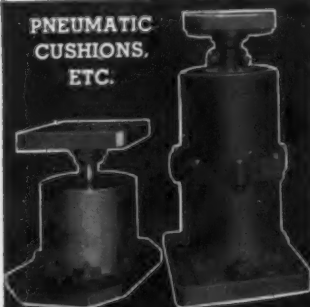
Steelweld one piece frame and sound engineering detail are an assurance of continuity in production — low costs mean easy shops.

THE CLEVELAND CRANE & ENGINEERING CO.
STEELWELD MACHINERY DIVISION
WICKLIFFE, OHIO.

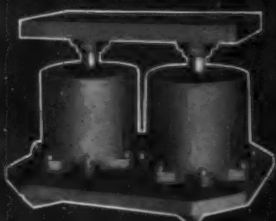
BATH & CO., GENERAL SALES AGENTS

E. 70TH & MACHINERY AVE. CLEVELAND, OHIO

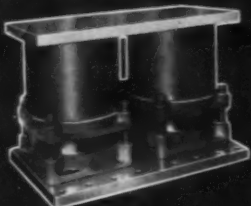
PNEUMATIC
CUSHIONS,
ETC.



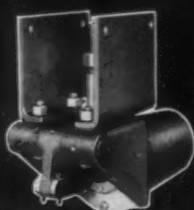
Single and double stage cushions.



Two single stage cushions mounted together.



Two self contained cushions, operate without surge tank.



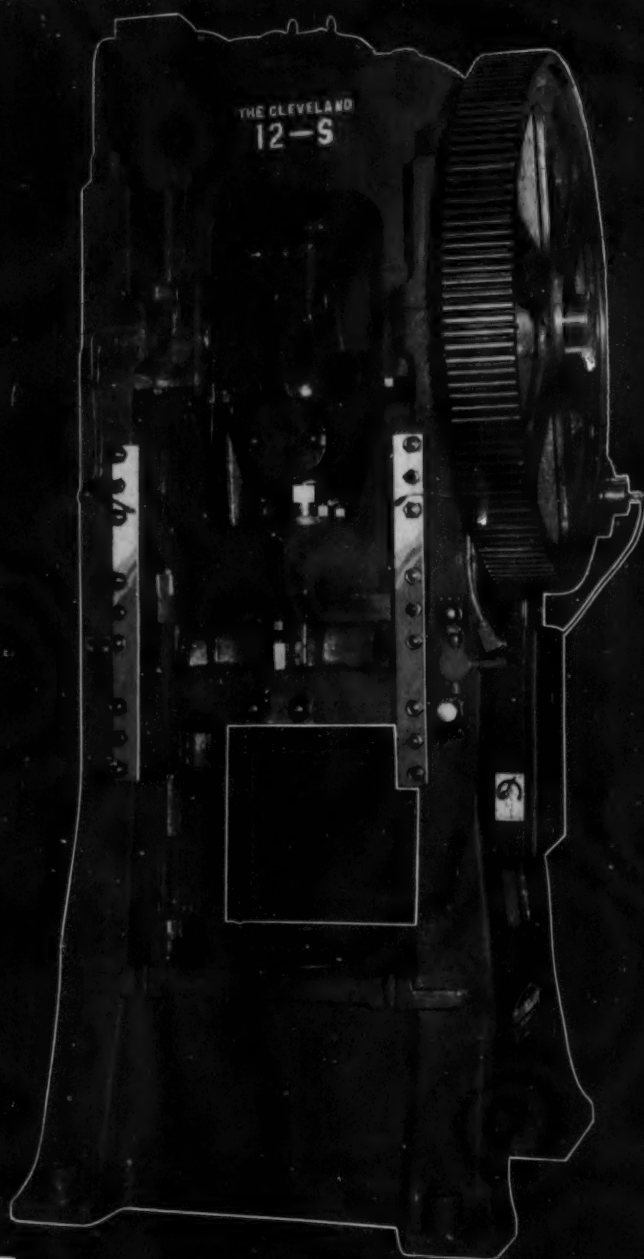
Electrically controlled air operator for replacing manually operated clutches.



Single disc coil stock cradle. Cap. 52"x20" max.



Heavy Duty Uncoiler, can be furnished in various sizes and capacities.

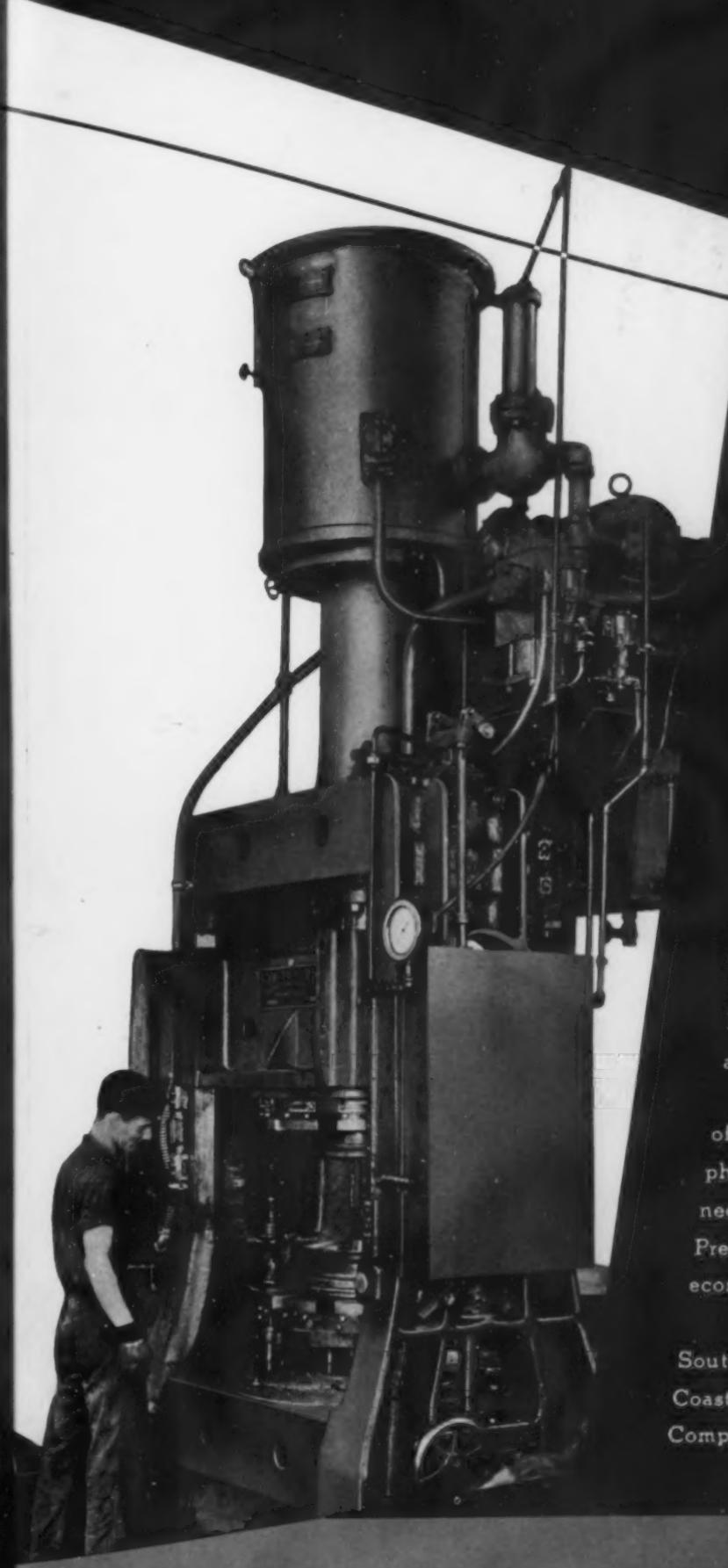


THIS Cleveland 12-S Straight Sided, Single Crank Press—which is equipped with an air operated friction clutch having electric controls and four station selector for "inching," long stroke, short stroke and continuous operation—is an interesting variation from the standard in that it is provided with a two speed gear arrangement whereby the strokes per minute can readily be changed from $22\frac{1}{2}$ (for drawing operations) to 45 (for blanking operations) without altering the speed of the motor.

Complete information on this, or any of the other different types of Cleveland Presses, will gladly be furnished on request.

THE CLEVELAND PUNCH & SHEAR WORKS CO.
CLEVELAND, OHIO

NEW YORK - DETROIT - CHICAGO - PHILADELPHIA - PITTSBURGH



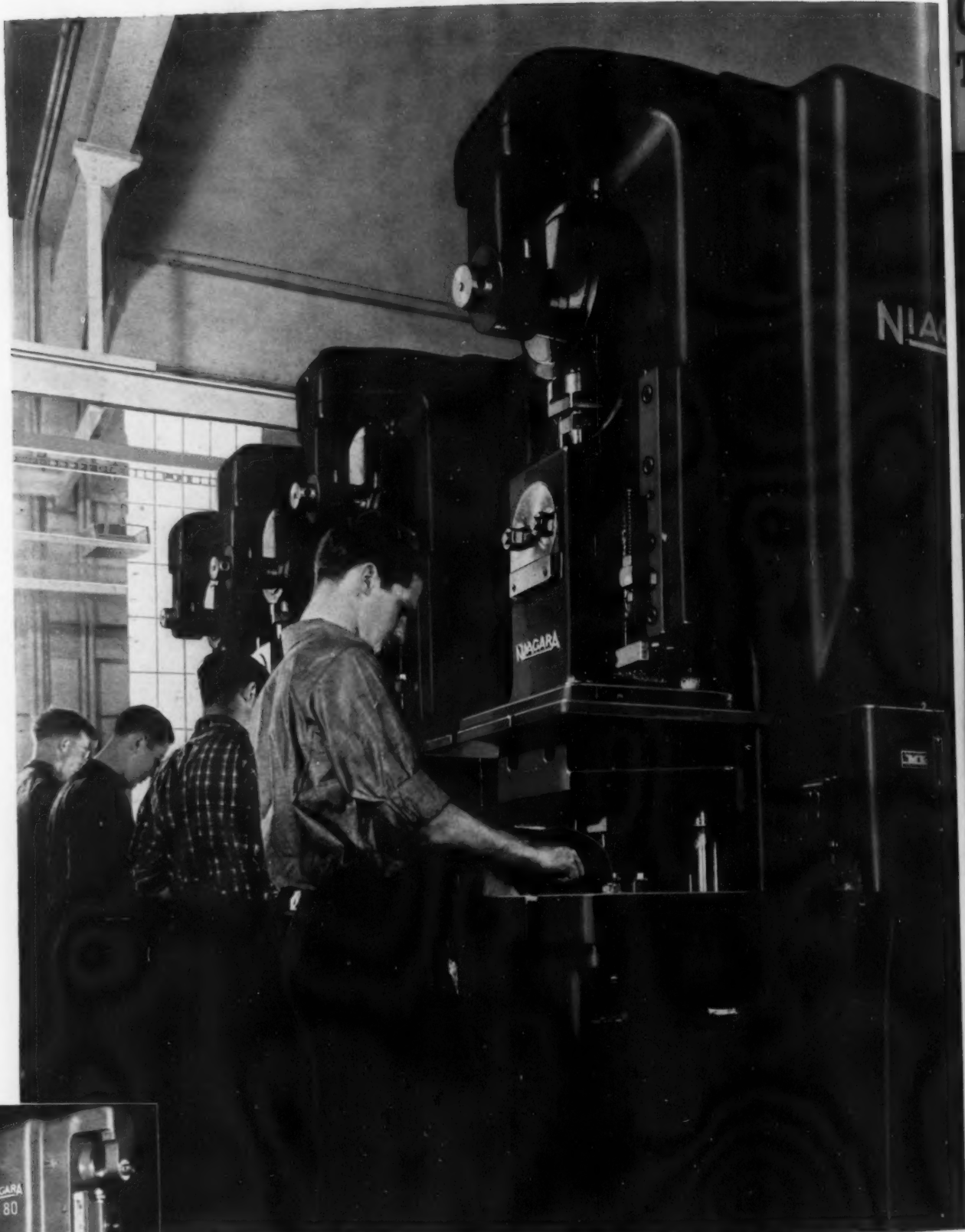
You can
PRESS
at a **PROFIT**
The Southwark Way

Southwark Hydraulic Presses have proven themselves in metal working plants the country over. They have increased production up to 70%, have lengthened die life as much as four times, have reduced rejects and repressings to a minimum.

Southwark has built a complete line of self-contained hydraulic presses for every phase of metal forming. Soundly engineered, carefully built, Southwark Hydraulic Presses can help you do a better job — more economically.

Baldwin-Southwark Corporation,
Southwark Division, Philadelphia; Pacific
Coast Representative, The Pelton Water Wheel
Company, San Francisco.

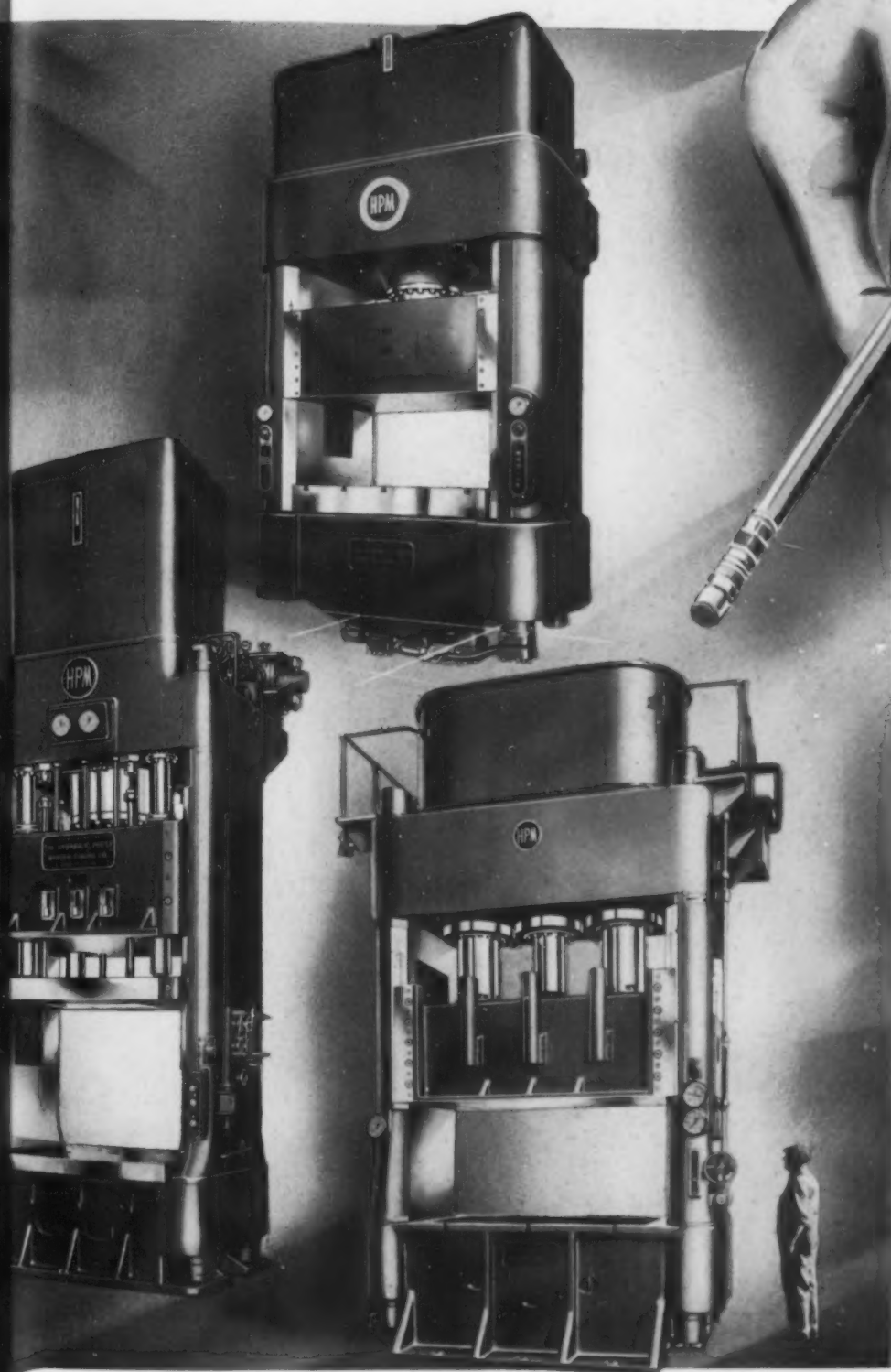
SOUTHWARK *Hydraulic* **PRESSES**



This group of Niagara Streamlined Punch Presses is one of several batteries totalling over a hundred Niagara Presses recently installed in the plants of one of the world's largest automobile manufacturers.

Because Niagara Streamlined Punch Presses are completely self-contained and require comparatively little floor space, they can be placed close together so that operators can pass the work from one to another, thereby decreasing handling costs on successive operations. When rearrangement of the production line is needed, it is a simple matter to move these machines because of their compact design and integral motor drive. Instant acting Niagara 14-Point Engagement Sleeve Clutch and anti-friction mounted gears operate in oiltight case. Niagara Machine & Tool Works, Buffalo, N. Y., Branches: New York, Cleveland, Detroit.

Choose YOUR PRESS WITH THESE BASIC THINGS IN MIND



Jot down these simple fundamentals of practical press performance.

"The press I buy must -

➤ Reflect a broad experience and sound engineering.

➤ Provide **PRODUCTION SPEED** for profitable operation.

➤ Assure **VERSATILITY** so that metal forming in small and large runs can be done economically.

➤ Have a press operating system that furnishes not only production speed - smooth and efficient performance - but **POSITIVE CONTROL** over every press movement."

These are the credentials of a good press. They are the things you get to a maximum degree when you buy a self-contained **H-P-M FASTRAVERSE PRESS** with its exclusive **CLOSED CIRCUIT** system of operation.

A letter will bring an H-P-M Engineer to talk over your production pressing requirements.

THE HYDRAULIC PRESS MFG. COMPANY

Mount Gilead, Ohio, U. S. A.

District Offices: New York, Detroit, Chicago

Representatives in Principal Cities

HPM FASTRAVERSE PRESSES

With their Exclusive **CLOSED CIRCUIT** System



Forging THE TOOLS OF INDUSTRY

And It's Erie Again... Forging parts vital to modern machine shop practice calls for the best in Hammer Design...Construction...Operation...Erie dependability plus the low cost of forging parts on Erie Steam and Board Drop Hammers are foremost among the reasons why leading Equipment manufacturers use Erie Hammers...36 years of sound design progress...building better than necessary...solid factors backing Erie's success in helping to build modern machines that create jobs for men. Write for your copy of Bulletins No. 325 and No. 328 on Erie Steam and Board Drop Hammers.

Time-saving machines made this hammer. Making this hammer made many jobs for men.



ERIE FOUNDRY CO.

ERIE, PENNSYLVANIA, U. S. A.

DETROIT
335 Curtis Bldg.

CHICAGO
549 Washington Blvd.

INDIANAPOLIS
335 Postal Station Bldg.

FRANCE
Fenwick, S. A.

CANADA
John Bertram & Sons Co., Ltd.

ENGLAND
Burton, Griffiths & Co., Ltd.

ERIE BUILDS Dependable HAMMERS

Announcing a Complete Line of **LAKE ERIE** **AIR OPERATED** **DROP STAMPS**

Lake Erie Drop Stamps are ideal for short run work; embossing; difficult-to-form low ductile alloys; and thin, quick cooling hot work.

These machines are compact in size and completely self-contained, ready to connect to compressed air lines.

Hand lever gives sensitive control of speed and power. Cam setting is adjustable for positive or oscillating motion.

Safety is provided by holding ram in two upper positions by gravity-drop safety dogs supported by anvil. Ram cannot be operated until safety dogs are pulled clear by air cylinders released by foot treadle. Overtravel from any cause is prevented by air cushion on top of cylinder.

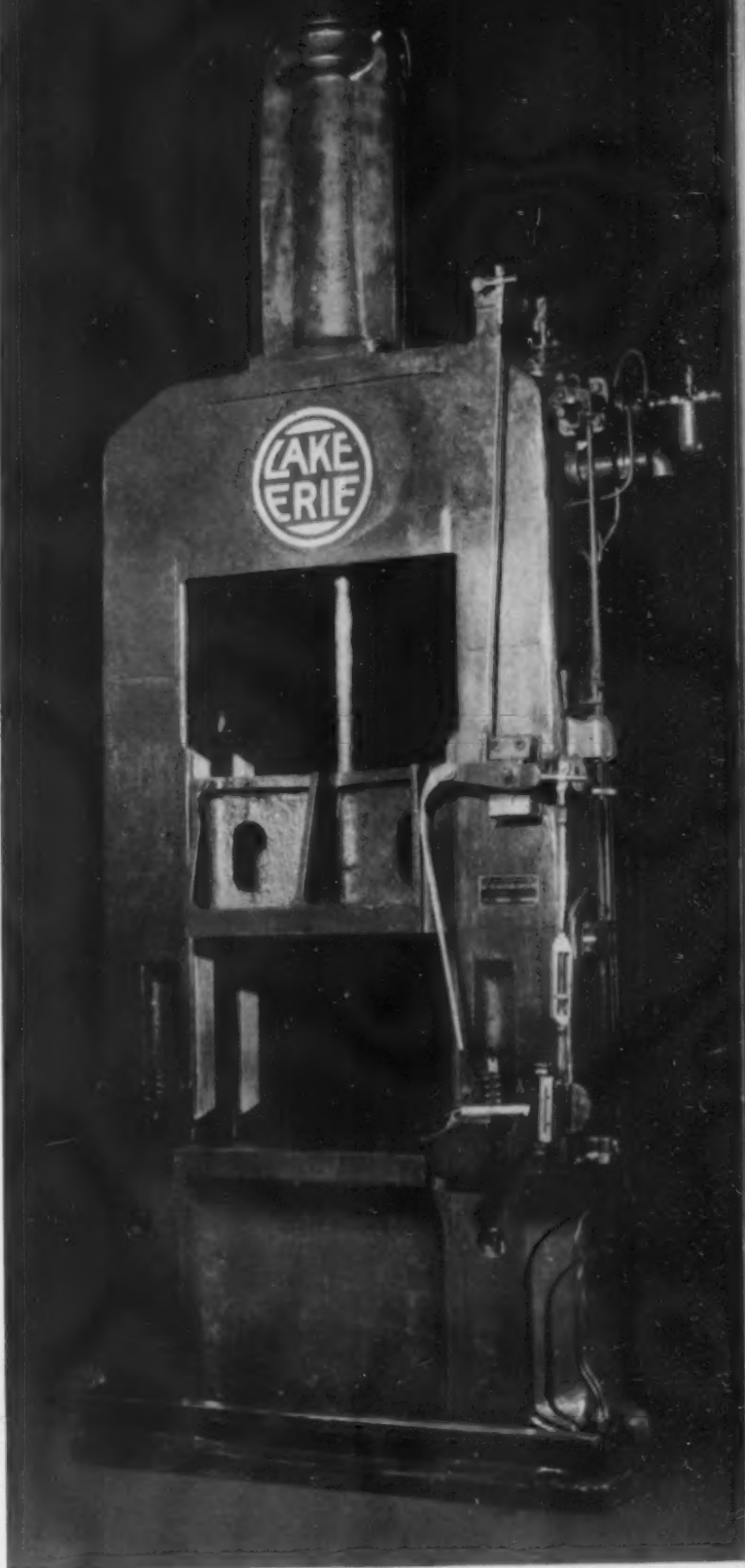
Ram is cast steel. Anvil is tough alloy iron.

Side frames are semi-steel of heavy box section having integrally cast double V-guides accurately machined and adjustable by means of locked wedge keys.

Control and throttle valve bodies are of close grain cast iron in one piece and bolted to yoke. The control valve is of the balanced type. Throttle valve, rotating type. All valves opened into position.

For air lubrication there is a hand operated primer oiler or use before starting and an automatic inspirator lubricator for continuous operation.

Complete information is available by writing the Lake Erie Engineering Corporation, Buffalo, N. Y.



Lake Erie Drop Stamps are built in five standard sizes from 30"x24" to 90"x48".

Write for Specification Sheets

LAKE ERIE ENGINEERING CORP.

Box 368 Kenmore Station, BUFFALO, N. Y.

Sales Offices: New York, Chicago

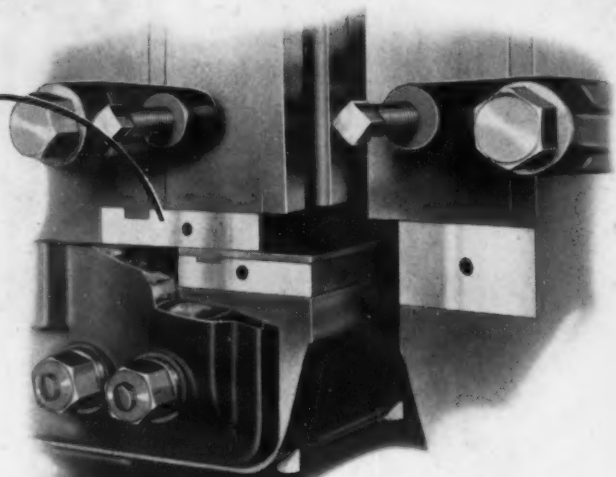
European Representatives:

BUCK & HICKMAN, LTD., LONDON, ENGLAND
FENWICK, S. A., PARIS, FRANCE
FENWICK, S. A., MILANO, ITALY
L. GARDIER & CO., LIEGE, BELGIUM
JOHN INGLIS CO., LTD., TORONTO, CANADA

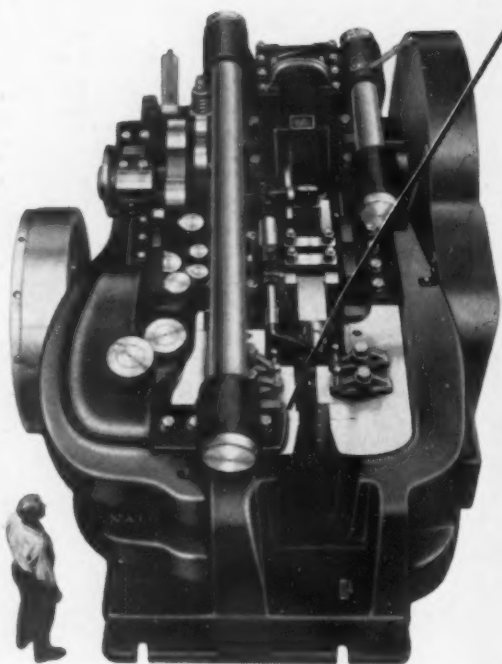
LAKE ERIE
ENGINEERING CORP.
BUFFALO, N.Y. U.S.A.

BUILT BY THE MANUFACTURERS OF LAKE ERIE HYDRAULIC PRESSES

**SINCE
1925**



FLOATING BREAST PLATES



IT avails nothing to provide accurate alignment in a Forging Machine gripping slide if some other feature destroys it.

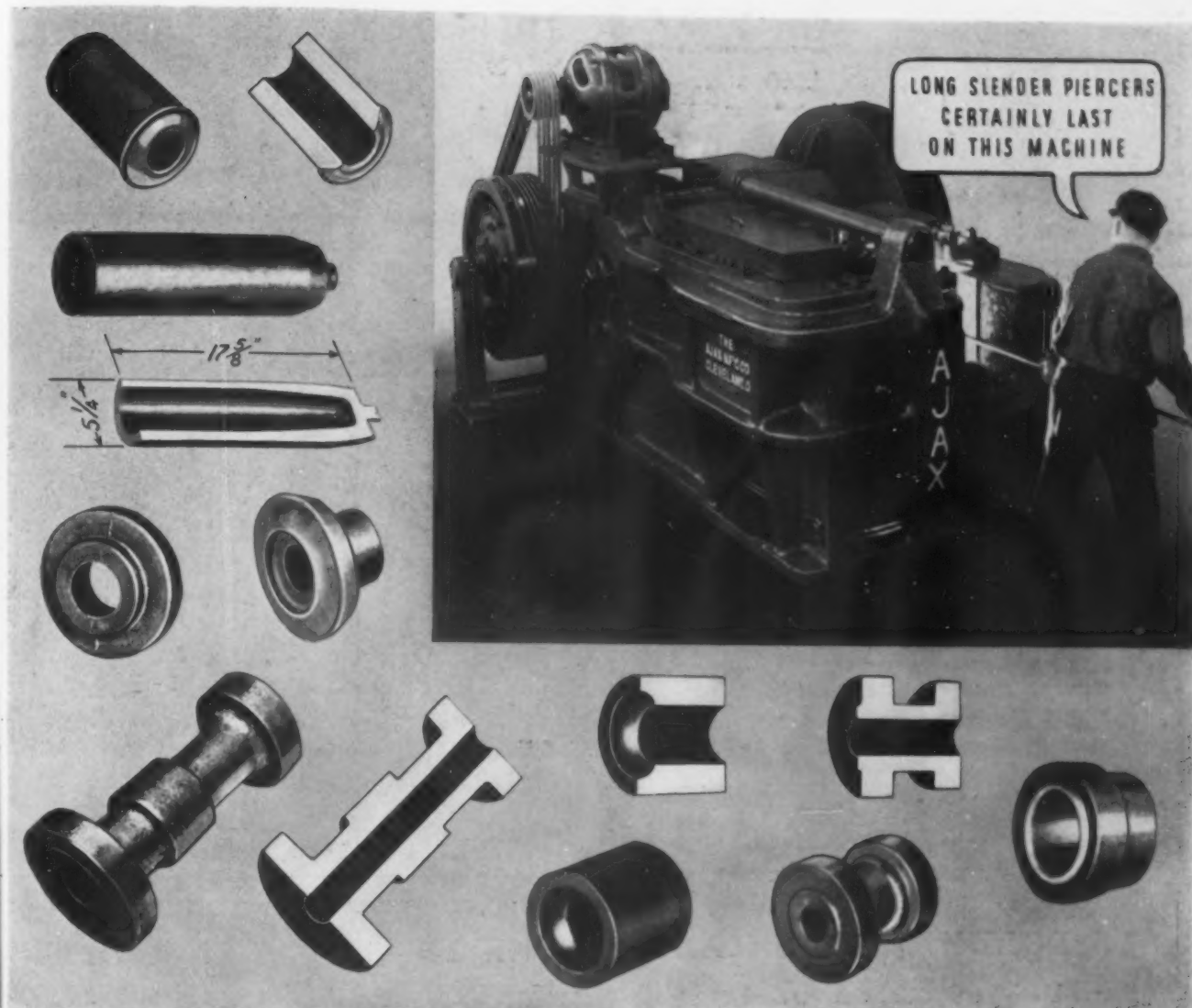
Realizing that accurate alignment would be quickly lost if the heading thrust had to be taken by the bearings of the gripping slide, National Engineers solved the problem by using a Floating Breast Plate which transmits the upsetting pressure directly to the Bed Frame. This feature has been available to National users since 1925.

NATIONAL
MACHINERY COMPANY
TIFFIN, OHIO.

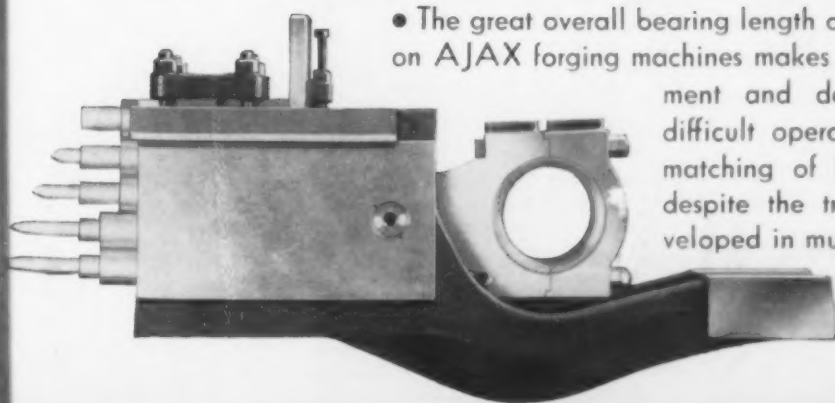
New York

Detroit

Chicago



Underarm Extension Guided Header Slide of
AJAX AIR CLUTCH FORGING MACHINES
for Internal Displacement and Deep Piercing



• The great overall bearing length of the extension guided header slide on AJAX forging machines makes them superior for internal displacement and deep piercing. • Many seemingly difficult operations are easy with the precision matching of heading tools in die impressions, despite the tremendous off-center pressures developed in multi-stage dies. Accuracy is just one of the many advantages of these solid frame, high production forging machines.

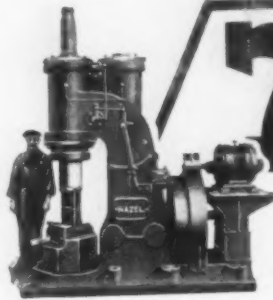
Write for Bulletin No. 65-A

THE AJAX MANUFACTURING COMPANY

621 Marquette Bldg.
Chicago, Ill.

EUCLID BRANCH P. O.
CLEVELAND, OHIO

201 Dewart Bldg.
New London, Conn.



7 money saving features



NAZEL MOTORDRIVEN AIR ACTUATED FORGING HAMMER

- 1 SELF-CONTAINED—Hammer, Motor, Compressor all in one!
- 2 CONSUMES POWER ONLY WHEN OPERATING!
- 3 GIVES A POWERFUL SQUEEZING BLOW!
- 4 POSITIVE IN ACTION!
- 5 SIMPLY CONTROLLED!
- 6 HEAVY, RIGID, DURABLE CONSTRUCTION!
- 7 EFFICIENT—Fewer reheats, less labor and lower costs!

Now Made and Sold by—NAZEL HAMMER DIVISION

LOBDELL

CAR WHEEL COMPANY
103 Years in Business
WILMINGTON·DELAWARE



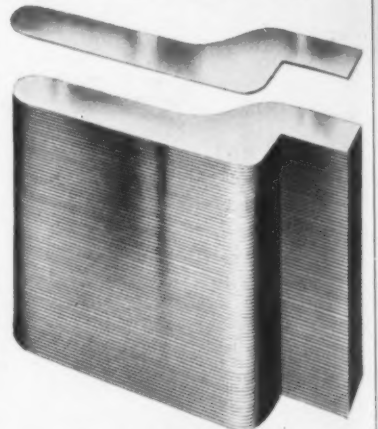
75 FOLDING ARMS MADE AT ONE TIME ON THE DoAll

Peters Machine Co., Chicago, stacked 75 pieces of .083" high carbon steel, tack welded the corners to form a solid block more than 6" thick. A layout line was scribed on the top sheet and the 75 parts made at the same time on the DoAll, in 4 hours, or about 3 minutes each. Labor cost, 3¢ each.



RECORD SMASHING!

Contour Sawing, the new DoAll process of machining, is recognized as the fastest precision method of removing metal; cuts out internal and external shapes from any metal up to 10" thick.



Does work of 3 machines. DoAll is a moderately priced, rugged, precision machine tool that replaces shaping, milling and lathe work on a large variety of jobs with enormous savings.

Used in large and small plants in 30 countries, by such firms as Ford, Fisher Body, Cadillac, Baldwin Locomotive, Douglas Aircraft, U. S. Navy, International Harvester, General Electric, Westinghouse, Ace Tool & Die, Glenn L. Martin, etc.

Let a factory trained man bring a DoAll to your plant and show you what it does, what it saves on your own work.

CONTINENTAL MACHINES, INC.

1311 S. Washington Ave. Minneapolis, Minn.

DO-ALL
Contour Machine
BAND SAWING
BAND FILING
BAND POLISHING

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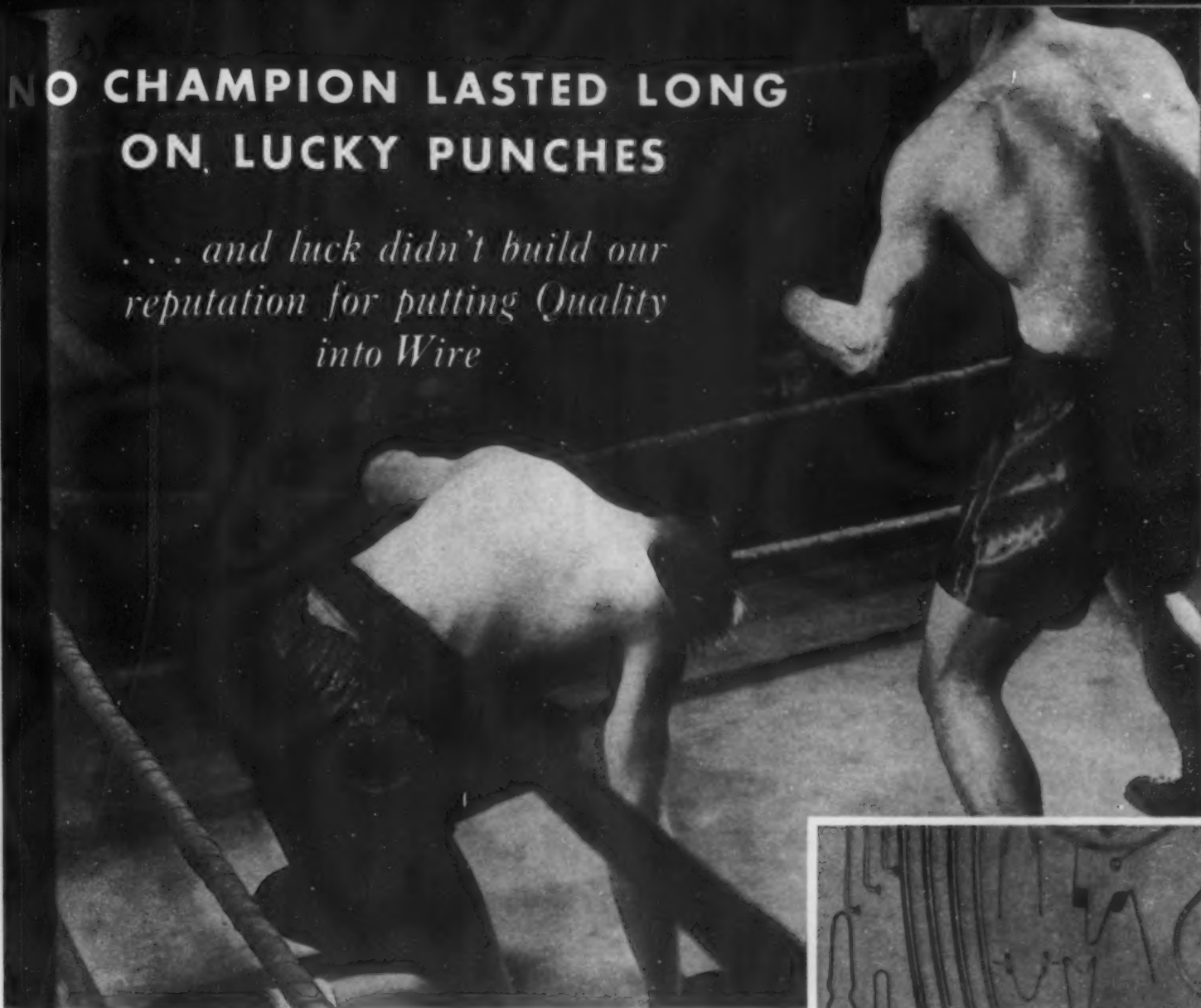
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*... and luck didn't build our
reputation for putting Quality
into Wire*



OUR reputation for putting quality into wire is built upon over 100 years of wire-making experience. In that time American Quality Wire has proved its ability to meet the highest quality standards wherever it is used. American Quality Wire is checked at every stage of its manufacture to assure the uniformity that helps to give trouble-free production.

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AMERICAN STEEL & WIRE COMPANY

Cleveland, Chicago and New York

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UNITED STATES STEEL



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FROM IRON TO STEEL — FATHER TO SON J & L QUALITY MARCHES ON

Experience and science join hands at J & L in the production of Controlled Quality Steels that work better, more economically—that pilot the way to new products, new industries and greater employment.



"The past and the present—in the making of iron and steel—meet here at this pulsating blast furnace. Modern as this giant is in construction, it still owns a relationship to the primitive little charcoal furnaces of the first 'iron masters' on the slopes of the Alleghenies. They could produce only a scant few tons of iron at a time. This mighty furnace of ours—one of eleven—produces a fiery stream of fluid iron every five or six hours—makes one thousand tons of metal a day—more than two million pounds! The daily capacity of the eleven J & L blast furnaces is 9,000 tons.

"This blower is the son and grandson of blast furnace men. His family have worked for J & L for more than 80 years."



From a drawing by ORISON MacPHERSON

"In this basic operation we have come a long way down the trail of man's inventiveness and his mastery of the metals. Combining the fruits of our research with the skill of our workmen, we have complete control of this monster so that it is made to deliver the exact quality of iron to flow naturally into the production of J & L Controlled Quality Steels. With the precision of a chemist we measure to the pound the tons of ingredients composing each charge. Thus, in these great furnaces, under 3,500 degrees of heat, we smelt the graded ore from our mines in Minnesota and Michigan with coke made from our coal mined in Pennsylvania and flux it with our own limestone quarried in West Virginia.

"There meet here—where the sparking, molten iron is channeled to the waiting ladles—man and machine—practical skill and laboratory science. This blower, who is in charge of the furnace, is the son and grandson of blast furnace men. All told, his family have worked for J & L for more than 80 years. His inherited knowledge is augmented by six years of night classes in an institute of technology. He knows iron. His ability to read the temperature of molten iron by looking at it is uncanny. Yet,

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"Thus, we march from iron to steel—from father to son—from skill alone to skill *and* science—constantly maintaining control of the quality of J & L steels. For you, and for all American Industry, this means steels that work better, more economically—steels that lend themselves to making more useful, beautiful, enduring things for a richer, fuller everyday living for all of us—new steels that pilot the way to new products, new industries, and an era of greater employment."

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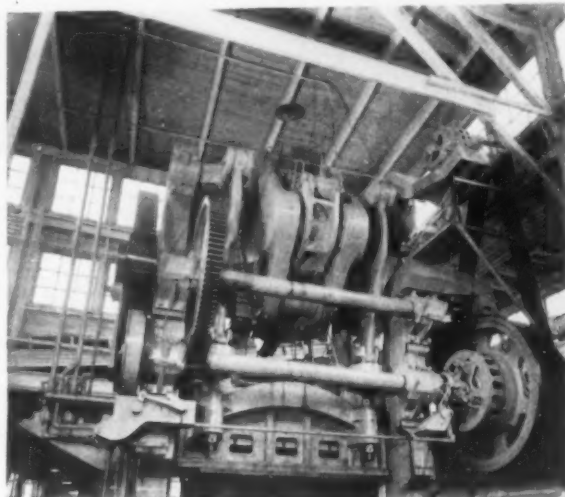
MORE SOLUTIONS TO LUBRICATION PROBLEMS

SUPERLA GREASE

Changing to Superla 2X grease for plain and anti-friction bearings saved about 50% in lubricating

costs at the Metal Auto Parts plant in Indianapolis.

Superla 2X is used on the cups in the large forming presses. Superla No. 39 has proved "very satisfactory" in



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It's a simple matter to find out whether you are getting rock-bottom cost in grease lubrication. Let a Standard Lubrication Engineer test Superla on just one bearing in your plant. It won't cost you a cent—you may save plenty.

TO HELP YOU JUDGE LUBRICATING OIL QUALITY

Whether you buy lubricating oil or are responsible for the equipment on which it is used, the booklet "Spare the Time to Spare Your Machines" will give you helpful suggestions for determining desirable qualities in an oil.

It describes terms like Demulsibility, Stability, and Viscosity Index and explains their importance in determining the type of oil for various services. A convenient source of facts about oil which you can use to advantage. Available only to readers in the Middle West.

STANDARD OIL COMPANY (Indiana)
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AUGUST

Gentlemen: I am in one of your 13 Middle Western states. Please send me the booklet checked:

- ☐ "Spare the Time to Spare Your Machines."
☐ "The Lubrication Engineer—His Value to You."

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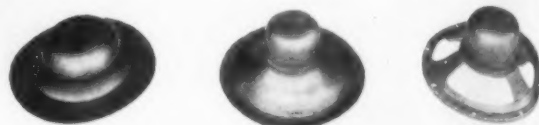
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STANOSTAMP

It takes only one application of Stanostamp "C" for all three steps to draw this radio speaker frame.

But the Operadio Mfg. Co. at St. Charles, Ill., also has two other good reasons for keeping Stanostamp on the job. It has saved hours of production time in cleaning the finished parts, and it costs 20% less than any product that even comes close to giving these advantages.

Notice how easily Stanostamp is applied. In front of the machine is a tank of Stanostamp into which sheets are placed and from which they are fed directly to the machine. This is the only application of Stanostamp throughout the operation.



Only one application of Stanostamp is needed for all three steps in stamping out this radio speaker frame.

The real reason for changing to Stanostamp was the time saving made in cleaning the finished parts. Stanostamp is readily removed in the degreasing tanks. In addition, the tanks stay clean longer and less chemical is needed.

Stanostamp is available in several grades for all types of work and for dipping, swabbing, or brush application.

Try it on just one job in your shop. A Standard Lubrication Engineer will help you choose the right grade and make a test.

You may reach one of these engineers at your local Standard Oil (Indiana) office or by writing 910 S. Michigan Avenue, Chicago, Illinois.

If it's **Ductility** you want
in a high tensile steel . . .

ITS INHERENTLY FINER GRAIN MAKES ALL THE DIFFERENCE



The White Motor Company uses National Steel High Tensile Alloy in its new White Horse delivery truck.

you can get it in

NATIONAL STEEL HIGH TENSILE ALLOY

The enthusiasm with which engineers and fabricators everywhere have accepted National Steel High Tensile Alloy and the rapidly increasing number of difficult applications in which it is being used successfully, give convincing proof that this high tensile high-ductile steel is today filling a long felt need.

The one characteristic of National Steel High Tensile Alloy which more than anything else is responsible for its remarkable success in solving difficult production problems is its unusual ductility.

This ductility—the result of an inherently finer grain and a balanced alloy composition—makes this steel suitable for many applications where ordinary high tensile steels cannot be used.

If you have a production or engineering problem to solve—particularly one involving cold forming properties in addition to high tensile strength—National Steel High Tensile Alloy may be just what you are looking for. Inquiries are invited.

National Steel High Tensile Alloy is available in sheets, strip, plates, bars and shapes.

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Information FREE

1. CRANE SPECIFICATIONS—In an effort to assist industrial crane users secure maximum performance from their traveling cranes, Whiting Corp., Harvey, Ill., has prepared a booklet entitled "How to Write a Traveling Crane Specification." The factors which must be taken into consideration are discussed in detail and a sample specification is listed. A brief description of crane construction is also included.

2. EYE ACCIDENTS—Valuable information concerning the cost and causes of eye accidents is contained in the booklet "Eyes Are Expensive Targets" just published by American Optical Co., Southbridge, Mass. Various practical plans are suggested for eliminating these accidents.

3. PLASTIC NEWS—In addition to news concerning new developments in plastic applications and manufacture and an article on the use of Ferrisul in passivating stainless steels and inhibiting the corrosive effects of mineral acids on these alloys, the latest issue of the house organ of Monsanto Chemical Co., St. Louis, contains a detailed analysis of the company's standing in the "Men Over 40" argument.

4. FLEXIBLE COUPLINGS—Complete engineering data, installation and operation information and recommended applications for the company's entire flexible coupling line is contained in this new catalog issued by Morse Chain Co., Ithaca, N. Y. Among types covered are silent chain, roller chain, Morflex and Morflex radial couplings and universal drive shafts.

5. HYDRAULIC FORMING—Applications, operating advantages, design and construction feature, capacities and sizes of hydraulic presses for metal forming are given in this 14-page bulletin issued by Farrel-Birmingham Co., Inc., Ansonia, Conn. Simple, flexible

and devoid of complicated mechanisms, these presses are said to be ideally suitable where uniform pressure and high accuracy are paramount.

6. WIRE FEED SCREW MACHINES—Combining of all controlling operations, including braking, into one control lever, high output and extremely short feeding cycle ($\frac{3}{4}$ min.) are features of the wire feed screw machines described in this booklet by Brown & Sharpe Mfg. Co., Providence. Other advantages credited to these machines are 20 spindle speeds, quick change-overs, automatic bar feed and automatic turret lock. Spindle capacities range from $\frac{3}{8}$ to 1 in.

7. ZINC DUST PAINTS—The characteristics of zinc dust paints as rust inhibitors are the subjects of this 38-page brochure being distributed by New Jersey Zinc Co., 160 Front Street, New York. The distensibility of these paints and their ability to adhere tenaciously and uniformly to both new and weathered galvanized iron and sheet zinc is illustrated by photographs. Results of test panels are shown and discussed as is also the use of these paints for such applications as stacks and other hot surfaces, trucks, prefabricated houses, barns, bridges, blast furnace tuyeres, cranes, etc.

8. BRAKES AND FOLDERS—New bulletin covering manually and power operated brakes and folders has been issued by Niagara Machine & Tool Works, Northland Avenue, Buffalo. Types of folds and bends that can be made and the number of operations required are illustrated. Complete information concerning construction and dimensions of the equipment is given.

9. STANDARD CRANES—Prominent features of electric overhead traveling cranes and sizes and variety of cranes available are covered in this new bul-

letin by Morgan Engineering Co., Alliance, Ohio. In addition to illustrating numerous applications, considerable space is devoted to describing the company's patented mechanical brake in which it is said various features have been incorporated which overcome weaknesses usually associated with this type of brake.

10. CONTINUOUS STRIP GRINDING—Continuous strip grinders, designed for grinding strip metal from coils through the use of factory coated abrasive belts, are described in this bulletin available from Mattison Machine Works, Rockford, Ill. Features include simple belt adjustment, cross-compensating contact roll to permit automatic adjustment for thickness irregularities, reversible drive motors and centralized operating controls.

11. HORIZONTAL HONING AND BORING—A newly designed machine capable of both boring and honing cylinders in a wide range of diameters and lengths is announced in this booklet by W. F. & John Barnes Co., Rockford, Ill. Outstanding mechanical features are a head designed to use micromatic hydraulically operated hones, hydraulically operated feed and stroke controls, a device for insuring parallelism of the cylinder bore with its outside diameter and extremely close feed and stroke adjustments.

12. AIRLESS BLASTING—An illustrated bulletin covering the complete line of standard and auxiliary Rotoblast blasting tables manufactured by Pangborn Corp., Hagerstown, Md., is now available. Numerous photographs show typical jobs being cleaned on Rotoblast tables and a list of users is given. Construction features are discussed in detail and a diagrammatic explanation of the economies said to result from the use of this method of airless production blast cleaning is included.

If you want the latest information in these brochures, encircle the numbers and mail coupon to

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PRODUCTION COSTS GO DOWN WHEN YOU MAKE YOUR MACHINES MORE FLEXIBLE!

**Your Machines Produce More . . . at Less Cost
... When you Put the Allis-Chalmers Vari-Pitch
Speed Changer on the Job! Get the Facts on
How it Saves You Time, Power, Space, and Money!**

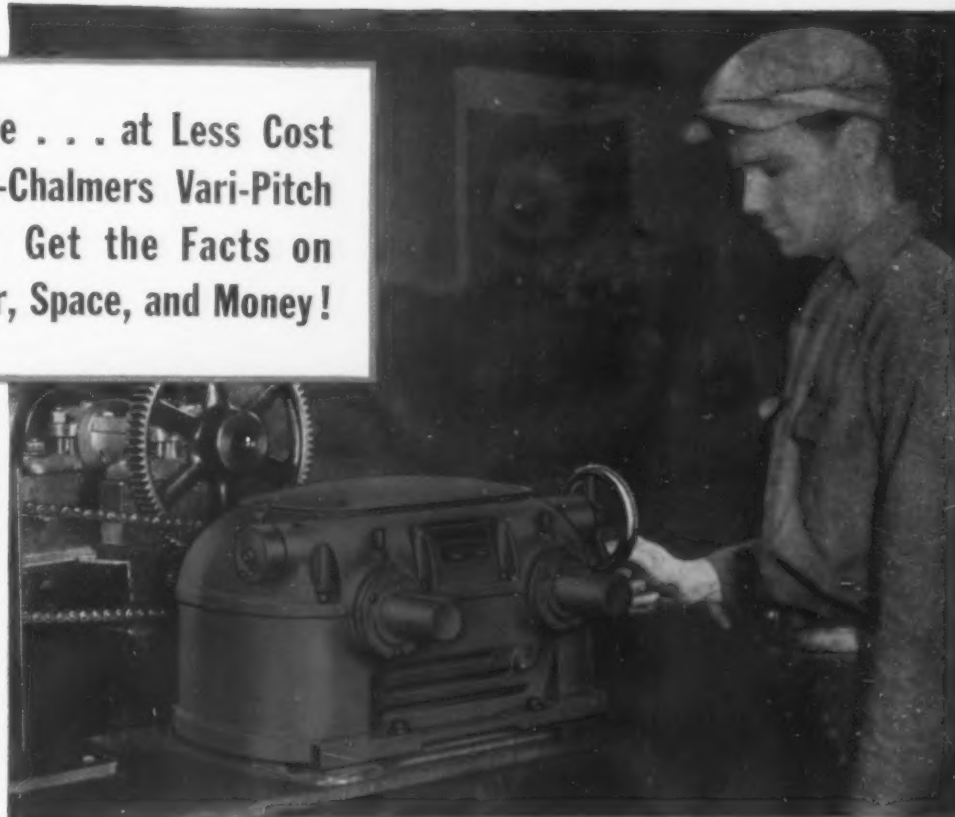
Think what it would mean to you in improving your production schedule if you could run your machines at *exactly* the speed to give you best results . . . and be able to change that speed Up or Down — instantaneously — to suit changing conditions!

And yet that's what the Allis-Chalmers Vari-Pitch Speed Changer is doing for hundreds of industries! And that's what it can do for you!

This variable speed changer is NEW . . . and it gives you NEW production advantages . . . production advantages that have never before been available. For the Vari-Pitch Speed Changer has no steps requiring adjustments . . . no springs or gears to wear . . . no guesswork on the operator's part.

Saves Space . . . Time . . . Power!
You don't need to stop the machine to get the speed you want . . . you merely turn the hand wheel (or flick a switch) . . . and the change in speed is made to the smallest fraction of an rpm.

Not only that—the Vari-Pitch Speed Changer is extremely compact . . .



takes only $\frac{1}{4}$ to $\frac{1}{3}$ the space used by bulkier transmissions. And through high efficiency operation, it makes big savings on power costs — an important factor that production men appreciate.

Find out about the Allis-Chalmers Vari-Pitch Speed Changer . . . how it operates to save you money . . . how it is built to give you years of profitable service. Get in touch with the transmission engineer in the Allis-Chalmers district office nearest you . . . or send for Bulletin 1266A.

BY SYNCHRONIZING A CONVEYOR and Shear used in cutting bats of steel wool, this Vari-Pitch Speed Changer provides exactly the right speed at all times . . . keeps production schedules steady . . . reduces production costs!

Available in sizes from 1 to 75 hp, ratios up to $3\frac{3}{4}$ to 1, maximum output speed 3500 rpm, the Vari-Pitch Speed Changer is a product of Allis-Chalmers, originators of the Texrope Drive and the Vari-Pitch Sheave.

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They didn't pamper that motor! They put it in a spot exposed to heat and moisture . . . hooked it to a pump . . . and put it to work 24 hours a day!

Not One Cent for Repairs!

Today—20 years later—here's the record! Not one cent has been spent for motor repairs! But that's not all! That Allis-Chalmers Lo-Maintenance Motor is doing as good a job for that brewery as the day it was installed!



HERE'S THE LO-MAINTENANCE Motor that set a record of 20 years on the job with no time outs for repairs. And it's still going strong today!

That's why the chief engineer standardizes on Lo-Maintenance Motors in his plant. And that's why Lo-Maintenance Motors are fast becoming standard equipment in hundreds of other plants throughout the country.

You'll like the protection against breakdowns the high carbon steel frame and indestructible rotor and stator give you! The full Measure Construction with no skimping on materials that means longer life . . . less servicing . . . extra years of trouble-free service!

Get the whole story of the motor more than just a rated horsepower . . . the motor that actually beats conditions that many times wreck ordinary motors! Call the trained production engineer in the Allis-Chalmers District Office near you. Let him show you how you can cut frequent time outs . . . reduce man hours due to motor failures . . . get longer motor life . . . with Allis-Chalmers Lo-Maintenance Motors!

*... 90 Years of Engineering
Superiority Work for You When
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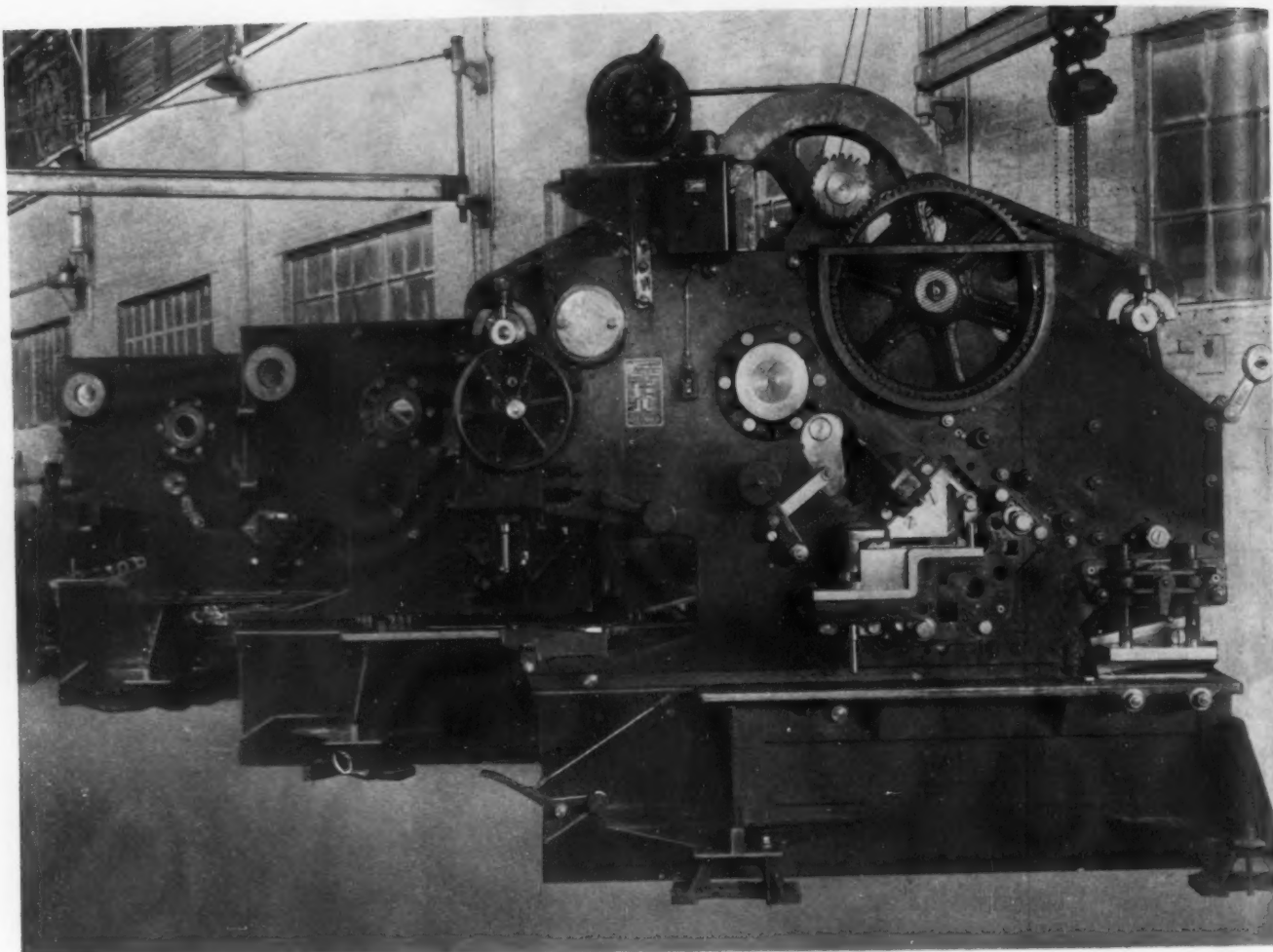
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THE IRON AGE

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... THE IRON AGE ...

AUGUST 10, 1939

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"Must" Is Getting Musty

○ F all the words in the English language, the little four letter word "must" is the most dangerous and disruptive one.

We encounter that truth early in life. Modern child psychology tells parents to steer clear of the mandatory "must." The boy who is told that he "must" go to Sunday school or that he "must" spend so many minutes or hours on his home work is likely to carry with him through life an aversion to religion or arithmetic.

The same thing is true in the psychology of management. It is said of Alfred P. Sloan, Jr., that he has made it a point never to issue a mandatory order to his executive subordinates. If he thought that a certain principle or policy should be followed, he undertook to "sell" it to his associates through discussion. A sound idea, that, and one that has kept General Motors out of much hot water. For if an idea contains enough good points to be acceptable, it should also be saleable to reasonable and experienced men. If it is not saleable, the chances are that the idea is "not so hot."

Yes, the word "must" is packed full of dynamite and fitted with a percussion cap. It is this simple little four letter word that has blown Mr. Roosevelt's so-called New Deal completely out of water.

It was this eternal succession of must, must, must's, that first soured business on the Corcoran-Cohen combination of Communism and State Socialism that attempted to disguise itself in the inoffensive garb of the Democratic Donkey. But business said: "Take off that ass's skin, we know you."

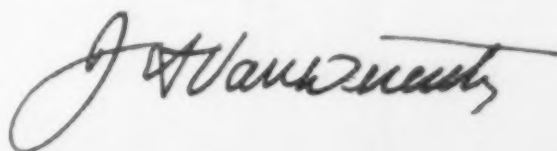
It was this same eternal succession of must, must, must's that has now soured Congress to the point that it has unmistakably said: "We now know you for what you are and are pulling the curtain down on the 20th century 'Comedy of Errors.'"

It is regrettable that the worthy objectives of recovery, social security and re-employment should have been set back from six to eight years by an amateurish approach. The "must" approach.

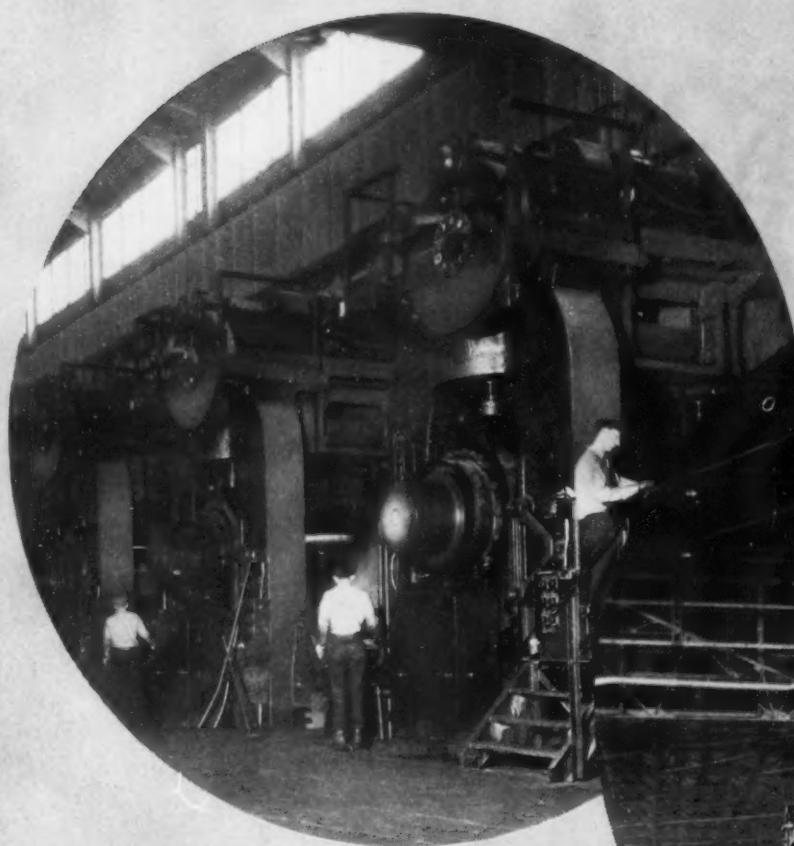
You cannot legislate morality. You can "sell" it, if you have the ability and use the methods of Christ or Confucius or Mohammed. None of them ever used the word "must!"

Now that the New Deal nightmare is over, perhaps we can look forward to the day when enlightened management and labor will solve their mutual problems through persuasive and sound salesmanship. That is the only way such problems will be solved.

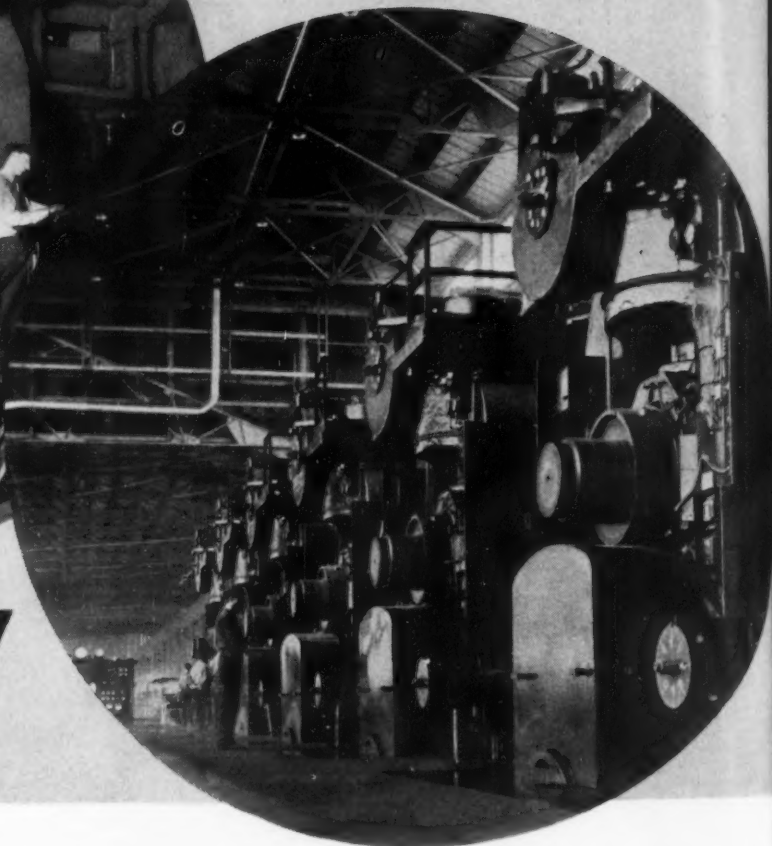
"Must" is getting musty. Let's put it in the garbage can.



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F. G. HUGHES

SELL YOUR ORGANIZATION As You Do YOUR PRODUCT

By F. G. HUGHES

*General Manager, New Departure
Division, General Motors*

IN this period of business recession, we have been hearing a great deal about "relations." Industrial relations, public relations and poor relations. So says the author of this article.

Originally given as a talk before the New Britain section of the A.S.M.E., the subject matter is so timely and of such broad interest to our industry that we asked Mr. Hughes to reshape it for our readers. This he has done. And what Mr. Hughes has to say is always worth listening to or reading.

THIS era in which we live has been distinguished by its so-called new modes of thinking upon social subjects. It is a period in which we have heard a great deal about various kinds of "relations"—industrial relations, public relations, and poor relations. The Government has taken over the responsibility for our poor relations and so the individual, having given up his responsibility for the welfare of his own flesh and blood, has had ample time to devote to thinking about his other relations.

The main trend of American thought and life from the period of discovery had been along individualistic lines. The freedom and rights of the individual have been safeguarded and woven into the fabric of American life. So that it was only under stress or grave emotional crises that the American people as a mass were accus-

tomed to arise and think and act materially as one. It was only after three years of the great war in Europe had passed that the American people, subjected to the most effective propaganda ever known, achieved sufficient unity of thought to act as one and enter the war. Having become victims of that emotional reaction, America has not yet been able to recover that individualism which brought it to the greatest pinnacle of material prosperity ever recorded.

The American business man took advantage of these habits of mass thought in the selling of his products through mass advertising, mass selling and group action.

American industry has progressed far in its recognition of its public responsibilities and its perfectly sound and justifiable recognition of the public as its best and only customer. No

system of enterprise in the world has been more customer-conscious than has been the modern American business. Its recognition of this is evident in the advertising pages of our thousands of magazines and newspapers, which have brought industry's products to the favorable attention of every conceivable type of consumer. It is only in the public relationships of the industrial organization itself that it has failed to keep abreast of the advertising which it has accorded to its products. It is a strange anomaly that the products of an enterprise may be favorably known to a vast public clientele while the reputation of the enterprise itself as an organization of men and women may not receive anything like as meritorious public recognition. It is even possible that this enterprise may have the most enlightened internal industrial relations policy and yet fail to enjoy that measure of public esteem to which its enlightened management would seem to entitle it.

"Kill the Golden Goose"

That the result has not been too happy a one I think we can readily agree, for we find that same public that desires to avail itself of the manifold products of modern industry and to convert them from luxuries into

necessities, only too ready to hobble, restrict, cripple and even destroy the very industrial organizations that have made such great contributions to its good living.

In high places there is ranting against invention, against labor-saving machines as breeders of unemployment and distress. Thus, in the Federal legislature as well as in the legislatures of several of our states, bills have been introduced, or actually passed which have the object of taxing machinery in proportion to the amount of labor that it saves.

It is possible that you, as engineers, particularly as mechanical engineers, are to be charged with the responsibility for these labor-saving inventions and directly that we shall have preventive measures proposed to deal with your misdemeanors. It is certain that you have contributed to the offense.

Since without you and your inventions none of these so completely misunderstood machines could have been created, I believe the matter of public relations has a vital interest to you. You, too, have given your relationship to the public too little consideration.

As engineers you still live in an individualistic world, too unmindful that the rest of it has become mass-minded, swayed by unreasoning mob emotion.

From your ranks have come not only the inventions and machines which have made the wheels of industrial progress turn so fruitfully, but you have largely furnished the minds that control their operation.

All engineers, all industries, and engineering industries in particular, face a most important and immediate obligation to cultivate a better understanding with the people with whom they live.

Industry, after all, is made up only of the men and women who comprise it and these are largely friendly people. Industry needs to publicize the same sort of friendliness that the little shop employing 10 to 12 persons found absolutely requisite if it was going to be tolerated in the neighborhood, to say nothing of receiving a character loan at the country bank.

Industry needs to show that it has

human kindness for the communities in which it lives. Business must emphasize those qualities that we recognize as constituting a fine character. Regardless of how large a business may be, it must be humble and learn to recognize that in a human world it is but one of many little things.

As engineers you have the responsibility and the intelligence required to cope with the problem. As merchants you have sold the American people the greatest share in good living the world has ever known. As manufacturers you have paid the highest wages, reduced the burden of labor, maintained the best of industrial relations and constantly reduced costs.

As American citizens it is your task to convince your fellowmen that you are alert to your responsibility to foster good public relations.

As engineers, that is today's most important job. Important as it is, it is even more important that we approach the job with a determination to master it, a determination reinforced by the knowledge that your very livelihood and that of free enterprise depends upon its correct solution.

To my mind, the habit of thinking, the training of engineers and managers is precisely the opposite to those methods which must be used to favorably influence American public opinion. In no small degree I attribute industry's failure to sell itself to the public to its failure to properly appraise its own shortcomings.

We are too prone to squint into the mirror when wide-open eyes might disclose our freckles.

Be Realistic

Two years ago during an extensive tour in Europe I learned a phrase that has left an indelible impression upon me. Time after time on the Continent I heard the words "be realistic."

Be realistic—the one thing you must be to succeed as an engineer or a manager; factual, honest, calm in appraisal of every problem. You have been realistic in your sales and advertising covering your product. With wide open eyes you have judged and chosen your markets, but you have squinted when it came to selling yourselves and your organizations.

Squinting—it is not so important what you see as what you do not see.

Steeped in facts as you are, in courting public favor, you have not been realistic. You have failed to recognize, and this I believe is industry's greatest failing, that the American people are NOT realists.

Coddled by a relatively soft and easy living, we have become a happy-go-lucky race, pliable to every emotion, living in a land of promise, we, as a people, resolutely refuse to be realistic.

How, then, would I suggest that you approach the problem of creating good public relations for industry?

I urge that we become realistic about the American public's mass mindedness. That's what wins elections; that's what causes strike riots, mob lynchings and pillories hard-working industrialists and inventors.

We, ourselves, have been too emotional, too unrealistic about the subject of public relations. We have understood and loved our facts and figures and expected the public that positively hates facts to love them too.

You would not expect your best girl to become very sentimental over a tabulation of cutting speeds and feeds, and yet we somehow expect the public to love us for our assets and liabilities.

Then since we are in earnest about this cultivation of good public relations, let's tell our story the way the public wants us to tell it and not as we would submit an engineering project.

In my prescription I think you will note I have stressed friendliness, neighborliness, kindness—all of them emotional attributes. In the application of these and others of their like, I believe lies the path to success in the courtship of the public by American industry.

From all that I have said, I hope you have gained at least the one, the controlling idea that I would leave to guide you as inventors, engineers, managers, and business men to success in this important field of public relations, and that is in recognizing emotional characteristics of the American public whose favor you must win.

BE REALISTIC.



PROPOSED STANDARD FOR SURFACE ROUGHNESS

UNDER the sponsorship of the Society of Automotive Engineers and the American Society of Mechanical Engineers and with the approval of the American Standards Association, a proposed American standard for surface roughness has been offered to industry for criticism and suggestions by the Sectional Committee on Classification and Designation of Surface Qualities.

Surface deviations are divided into surface flaws, such as scratches, cracks and holes; waviness and roughness. Waviness is a kind of surface deviation which consists of recurrent or random irregularities in a surface which have the form of waves. On "smooth machined" surfaces, the length of such waves ordinarily are between 0.04 and 1.0 in., and the height of the waves is generally not more than a few thousandths of an inch. Such irregularities can be measured by conventional dial gages of appropriate sensitivity.

Roughness is defined as recurrent or random irregularities in a surface which have the form of small waves or bumps. Roughness may be considered as being superimposed upon a nominal surface or upon a wavy surface. On smooth machined surfaces, the distance between the high spots of such irregularities is ordinarily between 0.0002 and 0.010 in., and their height is very much less than their width, usually being between 0.000001 and 0.0005 in.

The committee has expressed the proposed standards in terms of the root mean square average of the surface profile deviations in millionths of an inch, or microinch (abbreviated mu in.). As shown in the curve represent-

SPECIFICATION FOR SURFACE ROUGHNESS			
Roughness Symbol	Root Mean Square Height of Irregularities Inches	Microinches	Familiar Commercial Examples
63M	0.063	63000	Rough castings, rough machining operations, usually for clearance, where smoothness is no object, and where furrows are clearly visible and easily felt.
16M	0.016	16000	
4M	0.004	4000	
1M	0.001	1000	Turning, boring, and milling operations.
250	0.00025	250	
63	0.000063	63	
32	0.000032	32	Fine finishing operations generally having a shiny appearance. Diamond or hard metal, turning and boring, good finish grinding, honing, smooth molded surfaces, etc.
16	0.000016	16	
8	0.000008	8	
4	0.000004	4	Very fine finishing operations, grinding, honing, lapping. Work done with greatest care, typical of best current manufacturing practice, measuring gages, etc.
2	0.000002	2	
1	0.000001	1	
1/2	0.0000005	1/2	Highly polished finishes used largely for laboratory work.
1/4	0.00000025	1/4	

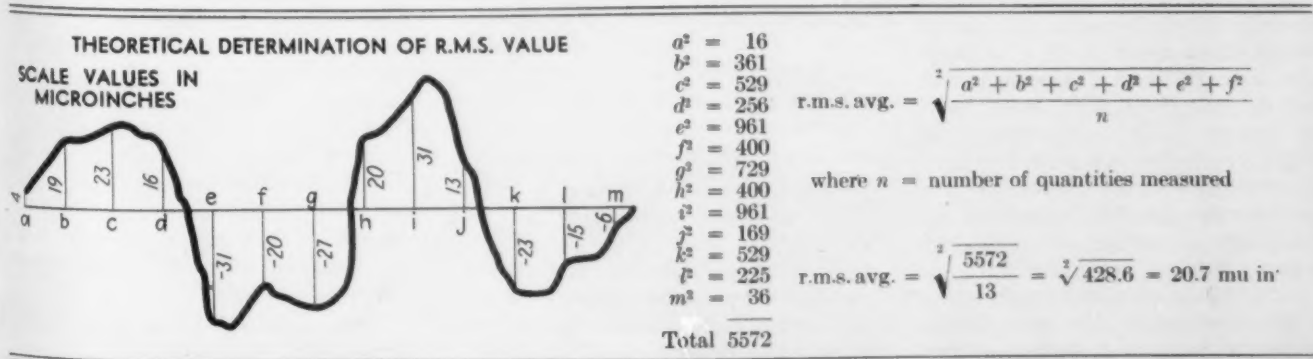
ing a typical cross-section of a surface, the r.m.s. value of the surface profile is the square root of the mean of the sum of the squares of the values being averaged, in the example, 20.7 mu in. Profile curves of surface irregularities may be obtained by the so-called tracer method or by visual and photographic examination, either with or without the aid of a microscope. Dark field illumination is particularly useful for very smooth surfaces.

For practical purposes, however, the only way of quickly determining the r.m.s. value is by the tracer method, using an electrical instrument that integrates the curve in the same way that an a.c. voltmeter reads the r.m.s. value of the sine wave produced by alternating current. The Profilometer, as far as is known, is the only in-

strument now commercially available that will produce such a reading. (Editor's note.)

The table shows the proposed basic standards, interpreted in terms of familiar commercial methods of producing the surface. An A.S.A. series of preferred numbers is utilized for the scale and additional subdivisions are possible. For designation on a drawing, the A.S.A. standard character V is used to indicate finish on a surface. The addition of a numerical symbol is to be used to denote the standard grade of surface roughness permissible, such as \sqrt{V} .

Comments on the proposed standard should be addressed to the Sectional Committee on Classification and Designation of Surface Qualities, in care of the A.S.M.E., 29 West 39th Street, New York.



BUDGETARY CONTR

A RECENT survey of industry in Wisconsin indicated that but a small percentage of its manufacturing and commercial organizations operate under complete budgetary control. Inasmuch as similar surveys in other sections of the country have disclosed like results, it cannot be assumed that this condition obtains only in this isolated area.

There is perhaps no subject in the field of business which is more discussed and less used than budgetary procedure. It receives wide attention and is much discussed because in all business men there is a germ of an idea that it spells the answer to good control. They know that budgetary control successfully carried many businesses through depressions and subsequent recoveries. Then why doesn't it receive universal acceptance? There are several reasons, as for instance (1) insufficient knowledge of the subject, (2) the rigidity of some budget plans, (3) the large cost of installation, and (4) the large cost of operation.

When answers have been provided for reasons (2), (3) and (4), insufficient knowledge as a cause for failure to adopt budgetary control will have been definitely and permanently eliminated.

It is true that budget procedures have been designed and installed which lack the elasticity that a dynamic going concern requires. The cure lies in designating an individual to head up the budgetary work who is experienced in the development and use of flexible "measuring sticks"; someone who is cognizant of the fact that budgets must throb with the pulse of the business. The fact that many budgetary plans which meet every requirement of a dynamic concern are in operation axiomatically establishes the availability of suitable personnel. Of course, suitable personnel embraces not only technical knowledge, but the ability to sell one's ideas to every departmental head in a business. The

By B. M. SAYRE
Vilter Mfg. Co., Milwaukee

• • •

proper individual for this work is naturally the one who can accomplish his task without evoking antagonism.

The cost of installation is entirely within the control of management. Why? Because the type of method used will determine the rapidity and ease of the preparatory work. If management will select a plan which bears no earmarks of the meticulous penny chasing type, the installation cost will be minimized. Hence, care should be exercised to adopt a procedure which is practical in operation; thus assuring economy.

The cost of operation is perhaps an insurmountable obstacle in the way of wider use of budgets. The cause for high operating cost usually lies in the frequently fallacious reasoning that budgets and the accounting for expenses must of necessity be closely related and consequently budget data must be prepared in conformity with the existing accounting practice. This condition need not prevail.

Plan Must Be Simple

To be effective as a tool of management, a budget plan must be designed so as to make for a minimum of mathematical gymnastics. It must be simple. It must be practical. A budget is a statement of company policies in terms of future profits. It should insure a means of short-term budgeting for current activities. It should provide the flexibility necessary for varying volumes of business. It must be sensitive to the needs of management.

Hence the modern concept of budgeting dispenses with many of the cumbersome details necessary for accounting compilation, yet it does not sacrifice a reasonable degree of accuracy and efficiency. Thus is the cost of operation reduced.

A hypothetical case will be described herein to illustrate a budgetary procedure which is economical in development and operation. What is more, this plan has been effectively and profitably used by many companies.

Fig. 1 represents a specific department of a fictitious company. It is in scatter dot formation. The dots represent the actual monthly total dollar expenses (burden) of this department over a period of 30 months at varying degrees of activity. It will be noted that the redistributed or service departmental charges are not included.

The base or measuring device is the standard direct labor dollar, which is defined as a rated (time studied) hour at a predetermined standard hourly labor rate for a specific operating station. In turn, a standard departmental direct labor dollar is developed as a result of a weighted average. While for many obvious reasons it is best to use standard labor hours and dollars, their non-existence does not preclude using an actual day rate payroll as the base.

The median line (A) is plotted to determine the monthly fixed (burden) cost of this department. The fixed cost is automatically indicated at the point where the median line crosses the expense line at zero on the base. This fixed cost represents the present company policy of what constitutes standby cost, or in other words readiness to serve at any degree of activity.

A sufficiently large number of tests were made to determine the degree of accuracy of this method of developing the fixed cost as against the customary conference method. In the conference method the budget director usually consults with everyone concerned and subsequently prepares tabular arithmetical data, indicating the manner of arriving at the fixed cost. The tests all indicated a remarkable degree of accuracy.

It would be well to mention that no budget is well accepted by any de-

CONTROL OF EXPENSE

partmental head unless he or she had a hand in its development. Hence, the reader should not be left with the impression that, once having decided on the control factors, the entire procedure is then foisted onto those responsible for the actual budgetary accomplishment. One of the principal reasons for the preparation of this chart is the ease with which it may be explained and sold to departmental heads and all others concerned with budgetary procedure.

When the fixed or standby cost is isolated, the remaining expense obviously represents variable or controllable expense. In other words this portion of the total expense fluctuates with the volume of production. As an illustration, reference to Fig. 1 will indicate a budgetary expense allowance of approximately \$7,000 for \$7,000 of standard direct labor. This is made up as follows: Fixed expense = \$2,400, controllable expense = \$4,600, and the total expense is thus—\$7,000.

It is now possible to determine the variability factor by obtaining the ratio of controllable expense to standard direct labor:

$$\frac{\text{Controllable expense}}{\text{Standard direct labor}} = \frac{\$4,600}{\$7,000} = 65.7 \text{ per cent}$$

For practical purposes, 66 per cent has been accepted as the variability factor. However, it is necessary that consideration be given the direct labor performance during the period charted to determine its efficiency. In other words, if the actual direct labor in this department is sub-standard, it is reasonable to assume that the indirect labor hasn't performed at any greater rate of efficiency and further, that more supplies, power, etc., were used than should have been necessary.

It is found that the direct labor index for this same period is 90 per cent. Hence, as noted in Fig. 1, 90 per cent of 66 per cent will be used as the variability factor, or an actual of 59.4 per cent, and a practical ratio of 60 per cent. Therefore, all budgets for

this department will allow 60 per cent of *standard* direct labor for controllable expense.

It is also necessary to adjust the day work (unrated production) before making the final budgetary allowance.

TO be an effective tool, budget control must be simple, practical, and provide flexibility necessary for varying volumes of business. The budgetary procedure outlined herein has these characteristics, and has been successfully used by small and large companies. The control features involved often pay large dividends.

Day work is assumed to be operating at the same rate of efficiency as the rated work.

Obviously, the formula is now very simple and budgetary performance is easily measurable and profits can be forecast with equal ease. Departmental foremen and supervisory divisional heads can be furnished with the fixed cost amount and the variability factor with the result that they can predetermine their allowable expense at any rate of activity. This may be done daily, weekly, or for any predetermined period. In actual practice foremen may convert the standard direct labor dollar base into hours and be guided thereby for the reason that it is easier for them to determine the number of scheduled hours of work.

It is true that the procedure just outlined deals with total expense rather than individual elements of burden, such as indirect labor, supplies, maintenance, etc., but the indi-

vidual elements can be plotted exactly as the total was; that is, if necessary. This procedure can be amplified and detailed to the most minute degree. But the more detail developed and used, the greater will be the cost of installation and operation of a budgetary system. Moreover, this plan is suggested for those who contend that they can ill afford a so-called complicated budget plan.

Performance Responsibility

The author has successfully used this system in plants producing an annual volume of business ranging from \$2,000,000 to \$8,000,000. There is a sound industrial policy supporting this plan. When management employs a departmental head and holds him responsible for the performance of his division, why not give him full authority to conduct his department as he sees fit? Is he any different from the general manager of a factory which is part of a geographically far-flung industrial organization? Is it necessary to inform him how much should be spent for supplies, waste, oil, etc.? Wouldn't it be simpler to inform the departmental head that he is expected to conform to a published set of company policies and that he is allowed a given sum to produce the required quantity and quality? Leaders have been developed by heaping responsibilities upon them and then compensating them in direct proportion to their accomplishments. Quite naturally this means that some form of incentive should be offered the departmental head for a performance which excels par.

No one held accountable for budgetary performance should be burdened with charges originating in other departments and beyond his control. Consequently, service departments such as purchasing and cost accounting, which are redistributed under good accounting practice, should not be redistributed for budgetary control. Charges against specific departmental budgets should consist only of ex-

penses within the control of that departmental head.

The contention that all expenses do not fluctuate in direct proportion to the production activity, but that they rather increase in step-up ratios has been disproved in actual experience. Statements by John H. Williams,¹ consulting management engineer, support this view. Then too, A. W. Bass,² director of budgets, Westinghouse Electric & Mfg. Co., also has pointed out that control follows a more or less smooth curve.

Data for Managerial Control

Fig. 1 merely records a historical fact. It provides the first control step because every supervisor will agree that a prior accomplishment can be duplicated. Experience with this method invariably results in future curtailment of expenditure without impairment of efficiency or equipment. Especially is this true if an incentive is provided.

Nevertheless, the analysis is incomplete. A control tool must be provided management for broader study and planning. The foundation for forecasting profits is then established through the graph in Fig. 2.

The first point to be noted on this chart is that the redistributed departments, or service centers, have been included. Inasmuch as it is necessary to determine the total cost of this department, cognizance is given all pro rata charges originating in other divisions such as cost accounting, purchasing, power plant, etc., even though these costs are beyond the control of the departmental manager under consideration. Fig. 1 indicates a fixed cost of \$2400 per month whereas Fig. 2 shows an increase to \$9000. The difference, or \$6600, represents not only the pro rata items earlier discussed, but the non-controllable fixed items of depreciation, insurance and taxes. (Refer to curve C in Fig. 2.) It should be further noted that this study embraces an entire year, as contrasted with the monthly data in Fig. 1.

What constitutes plant capacity and normal volume comprises a separate study; therefore, no reference will be made herein to the steps necessary for their determination. Suffice it, that the capacity of this plant is an annual volume of \$3,000,000 and that its normal volume is 70 per cent of capacity or \$2,100,000. Further analysis indicates that the portion of the normal volume of product fabricated in de-

partment No. 77 requires \$105,000 of standard direct labor.

One more curve (B, in Fig. 2) is essential in order that the break-even point may be charted. Whereas 60 per cent was agreed upon as the variability factor, and whereas this represents the variable or controllable expense, curve (B) commencing at zero volume of sales should intersect the break-even point where 60 per cent of the amount of the direct labor is added to the fixed expense of \$108,000 per an-

naturally varies with the volume of production because of the use of a standard burden rate.

It perhaps is unnecessary to state that while a study of these charts discloses the condition of one department only, a combination of several departmental charts presents a consolidated company picture. The company survey usually requires more detailed information, which is secured from the respective departmental charts and data. This description has been

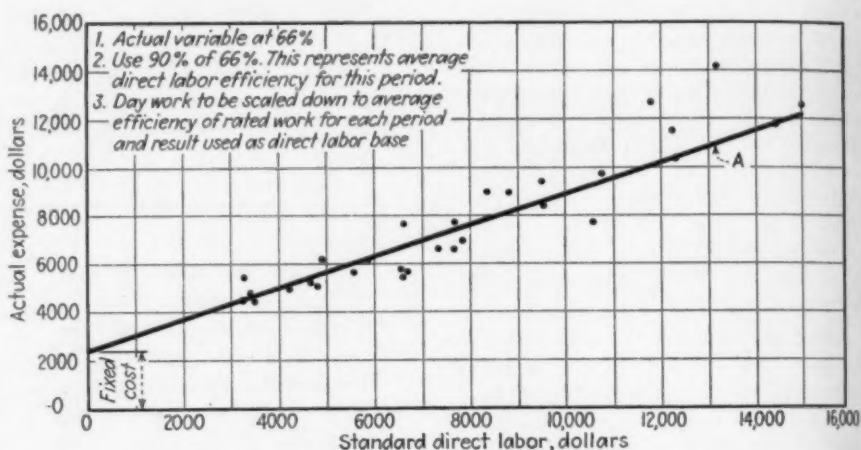


FIG. 1—Department No. 77, over a period of 30 months, without redistributed departments. The base is the standard direct labor dollar.

num. As an illustration, for \$70,000 of direct labor, the variable expense is 60 per cent of \$70,000 or \$42,000 plus \$108,000 of fixed expense, which is equal to a total expense budget of \$150,000.

Manifestly, the total of the expense budget would be absorbed into production cost at an activity of \$105,000 of direct labor (break-even point) if the burden rate applied is correct. Curve (D) indicates the correct burden rate to be 163 per cent at the normal volume of production line.

$$\frac{\text{Budget}}{\text{Direct labor}} = \frac{\$171,000}{\$105,000} = 163 \text{ per cent}$$

Once more referring to the company historical records, it is found that the average earned burden rate has been 130 per cent of the standard direct labor. Consequently, curve (E) is plotted so as to represent 130 per cent at the break-even point and rising from zero sales volume. The area between curves (D) and (E) at the break-even point or \$35,000 is the indicated annual loss because the applied burden rate is 25 per cent lower than the budgeted expense cost. This loss

limited to one department in the interest of simplicity. With this graphic story before it, management can make the several decisions necessary to insure profits. Management will ask itself the following questions and as a result of its findings determine future policies and prices.

- (1) Does the company gross profit compare favorably with the industry?
- (2) If the gross profit is higher than the average in the industry, shall costs be increased so as to absorb the entire burden cost at a normal volume of business?
- (3) How does the fixed expense compare with the industry?
- (4) What can be eliminated from fixed expense?
- (5) What can be done to control the variable expense?
- (6) Will a supervisory incentive result in lower and controlled costs?
- (7) What will the cost be of securing a greater volume of business so that all of the burden will be absorbed into production cost without increasing the burden rate?

The last question is an especially

¹ "The Flexible Budget," by John H. Williams, McGraw-Hill Book Co., p. 61.

² N.A.C.A. Year Book, 1931, p. 38.

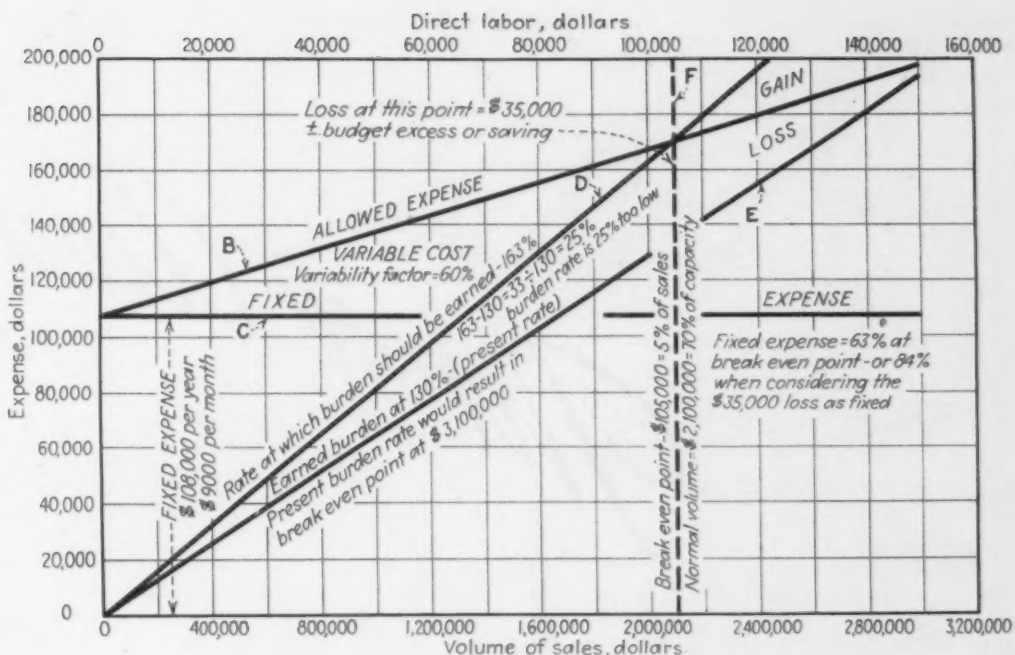
AT RIGHT

FIG. 2—Department No. 77, including re-distributed departmental expenses. This chart is a foundation for forecasting profits.

• • •

BELOW

FIG. 3—Total expense of Department No. 77, without re-distributed departmental expenses. This graph sets forth only the controllable expense of the department.



important one and yet it can be quickly and accurately determined with analysis of this graphic type.

Forecasting Profits

It is not intended that this paper carry the reader through a step-by-step process which eventually develops into the completed profit forecast. It is assumed that studies similar to that portrayed in Figs. 1 and 2 have been pursued for every department and that a sales quota has been established. It is also assumed that the correct base has been established for each department. For instance, tons shipped may be the base for the shipping department and dollar volume sold be the base for the sales department. A consolidation of all the departments would naturally follow and a profit forecast prepared.

Management now has something to work with; something into which it may sink its teeth, and it is merely necessary to arrange for suitable control.

Control Data

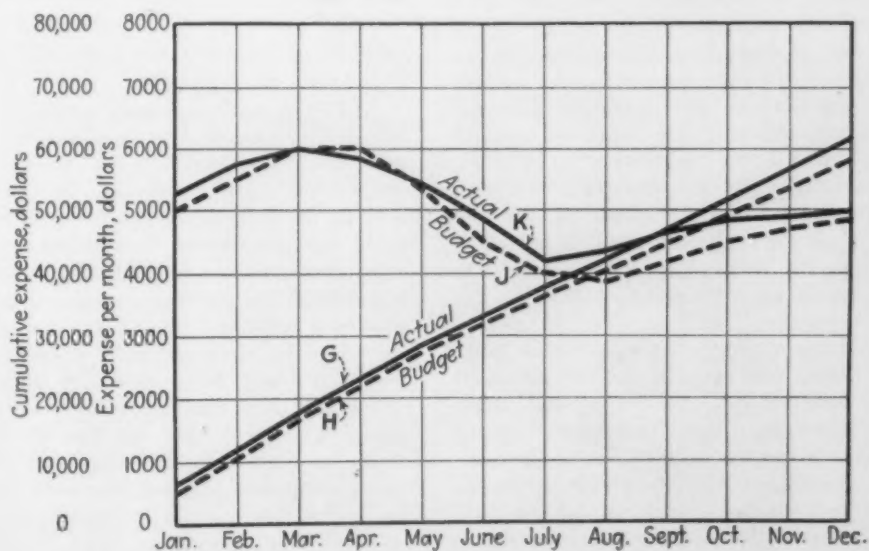
The merits and demerits of graphic versus the commonly known tabular reports will not be discussed. Both have their place. However, the graphic type illustrated in Fig. 3 is recommended for the sake of economy. Experience also prompts its use because many executives are too busy to study voluminous detailed reports and because factory supervisors show a decided preference for a report which has a semi-engineering character.

This graph sets forth only the controllable expense of the department. It may be prepared daily, weekly, monthly or for whatever period is decided upon. It may represent the total controllable expense of the department or individual charts may be prepared for every respective element of expense. Occasionally one chart is furnished for the total expense and others for the more important elements such as indirect labor, supplies, and maintenance cost. The supporting accounting details are, of course, always available for study of the cause for variation from the budget.

Curves (J) and (K) represent the budgeted and actual monthly expenses

respectively. Curves (G) and (H) represent the actual and budgeted cumulative expenses respectively.

The budgetary procedure outlined herein has been successfully used by small and large companies. It is inexpensive in development and operation. Its simplicity is its best feature; nevertheless, care should be exercised that experience dictates its development and operation lest the measuring devices be incorrectly determined and the budget too easily attained. Its use will answer many present apparently unanswerable managerial questions. It provides an accurate measuring stick for future policies and its control features pay good dividends.



Throw Away the

DIE construction for cold drawing steel requires great skill, although in some shops failure to recognize this results in low production and scrapped dies. Last week the author described this unfortunate situation, and went on to point out the advantages of center-bearing dies, the removal of die "ring," etc. In this, the second and last section of the article, the making of a center-bearing die is described, along with discussion of the evils of "try out," troubles due to "kinky" bars, "cracked corners," etc.

• • •

THE history of the conventional cold drawing die (Fig. 3, first section, Aug. 3 issue), dates back to the infancy of the process. The writer recalls seeing only a short time ago one of these dies, which had been made more than 20 years ago, used for drawing 1-in. hexagon bars. This particular die was 12 in. in diameter and 2½ in. thick, and around its circumference was shrunk a ring 2 in. thick. It is apparent from these measurements that the subject of die strain was little understood at that time.

The conventional die (Fig. 3, in first section), has a large opening at face "A." The reason for this apparently unnecessary weakening of the die blank becomes clear when the method used by the die maker in making this type die is understood. First, a starting hole is drilled in the die blank; next the die blank is heated to forging temperature, then punched to within approximately 0.100 in. of the finish-size, using a roughly shaped hexagon punch having a steep taper throughout its length. Next, the die is "roughed out" by filing, and, after completing this roughing process, there results a sharply tapered hexagon-shaped hole in which so far no provision has been made for the bearing, or size-point. Now, the die is

placed on a U-shaped steel block with the face of the die having the small opening pointing upward, and the die maker by using a 10-lb. hammer and another hexagon punch having less of a taper than the one first used proceeds to form a bearing or size-point by driving this punch into the opening. Note that the taper originally punched will have very little connection with the bar to be drawn, but acts as clearance for the punch just used. This process continues with the die maker relieving the work of the punch now and then by a few strokes of the file until the die reaches the point where it is ready for hardening.

After the die is hardened and tempered, it is measured to determine the amount of stock necessary to remove before it is ready to try out, then the hammering process continues. At this point the die maker is treading on dangerous ground—he is dealing with a hardened die, and there is *very little give* to a hardened die; so it is necessary for him to depend more upon his file. In filing any shape die it is necessary that the die maker have complete control over his file at all times, and when the die maker has to exert abnormal pressure in order to make his file cut the result is that part of this control is lost. Also,

consider what has happened to the die maker with the hammer and punch. By repeatedly driving the punch into the die after the die was hardened he has caused the bearing surfaces of the die to become "glazed," and instead of his file cutting as it should it slips and slides over the surface. To overcome this condition it is necessary to exert pressure, and in doing so he loses control of the file and invariably grooves one or more corners of the die. The result is a condition known in the craft as "high corners"—so-called as it results in high corners being formed on the bar as it passes through the die.

Recently one mill was involved in a situation that had elements of both tragedy and comedy. The customers of the mill involved apparently had been suffering from an epidemic of "high corners" for nearly all orders for shapes received in the cold drawing department carried a customer's notation of "no high corners." This admonition was so insistent that for some time the mill had employed two men for the purpose of filing the high corners from the bars, and more often than not the bar machines lay idle while the operators helped out. One of these men had grown particularly proficient at his task, and acquired some local reputation for himself due to his ability to remove such corners without leaving too much evidence of their original existence. In fact he was boss of a two-man job. About this time a supply of center bearing dies were being accumulated for a scheduled aircraft order of 10,000 hexagon bars of 3.50 per cent nickel steel of high hardness. These dies were put in production as soon as the bars arrived in the department, and soon the shop was turning out

SCRAP BARREL

By S. A. MOHT

bars faster than that particular mill had ever seen bars pile up. The breaking down operation on 10,241 bars was completed without a scratch or high corner and the boss over the filing horses was beginning to show concern. Then, the performance was repeated after the bars were heat treated. And that clinched matters. The "boss" was a boss no longer—he was relegated to the yard gang, the other man to the pickling department, the former being quite profane about the danger of new practices.

The importance of this situation was the fact that the condition was allowed to continue for so long a time that it came to be regarded as a necessary part of the production routine. When men are hired for the express purpose of attempting to camouflage the finished bars so that they would pass inspection, then the set-up should immediately have been recognized as uneconomic.

However, to return to the construction of a conventional die, it can be assumed that the die has finally reached the stage where it is ready for a try out. The die maker, lacking definite data pertaining to the amount the bar will swell in drawing, will leave in the die from 0.006 to 0.020 in. of excess stock, depending upon the bar size. The "trying out" process determines how much of this stock must be removed to attain the necessary size, whether or not there is a twist in the die and if the bar conforms to a true hexagon.

Quite likely nothing in the tool and die making industry is so annoying as this "trying out" process. Die makers without number have spent hour upon hour in this unnecessary trotting back and forth between the bar machine and the die bench, only to finally scrap the die due to high corners or over size. Today, such methods are viewed with some contempt, but it is unwise to be too hasty in passing judgment

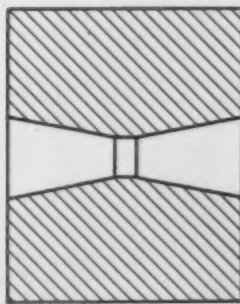
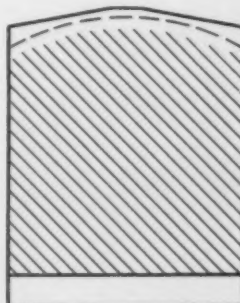
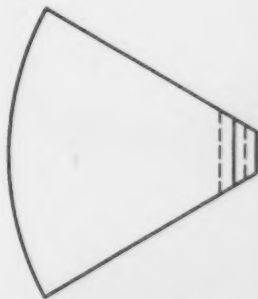
or in self-congratulation regarding the giant strides along the path of progress made by the steel industry since the days when the die makers' most important tool was a 10-lb. hammer—for in a number of mills this 10-lb. hammer is today just as important as it was 30 years ago.

Fig. 6 shows a section taken from a conventional die such as that shown in Fig. 3. This section shows the two forms of bearings most commonly found in this type of die and their respective action on a bar of steel while it is being cold drawn. In the throat represented by the solid lines, very little drawing action is possible. The action here more nearly resembles a shearing action and is a constant source of trouble, invariably causing a scratch which is carried across the bearing itself and constantly increasing in size. If not immediately detected, it will rip both bar and die beyond repair.

However, in the bearing shown by the dotted lines the drawing action is more gentle, although the advantage thus gained is offset by the long distance the bar must travel across the bearing surfaces thus causing excessive friction, and this is always fatal in drawing non-corrosive steels and far from desirable when drawing heat-treated steel. Regardless of the shape of the throat in this type of die the bearing will invariably extend to, or nearly to, face "B" of the die, with no provision made, as in Fig. 5, for controlling the swelling of the bar. The result is that all swelling of the bar takes place outside of the die, and thus the bar is free to assume a form other than that intended or desired.

It has long been the contention in cold drawing circles that excessive wavy and kinky bars are caused by short-bearing dies. The writer has never found any evidence to support this theory, but to the contrary has

FIG. 4—Punching of a center-bearing die. The dotted lines show the approximate form of the die when it is finished.



often used short-bearing dies to overcome these conditions. Chrome-molybdenum heat-treated bars having a Brinell hardness of 310 have been found to be so badly kinked after passing through one of these dies, shown in Fig. 3 (shown last week), that running them through an automatic bar straightener was most unsatisfactory. Even after the hand straighteners had spent long hours on them very few were straight enough to pass inspection. On constructing a center-bearing die and placing it in operation, the resulting bars were entirely free from kinks and were of uniform size throughout their length. In fact the remaining 1800 bars drawn

leaving 0.060 in. of stock in the die for the die maker to file. By cutting out a section of a die having one bearing or size point, after the punching is completed, there results a section corresponding to the three views shown in Fig. 4, with the dotted lines showing the approximate form of the die when finished.

Next, the die maker files the die to within approximately 0.005 in. of the finish size of the die. It is in this roughing process that the die maker establishes the throat radius, length and shape of the die bearing. Only after trying many different angle punches was the 10-deg. angle adopted as the angle which will blend into a

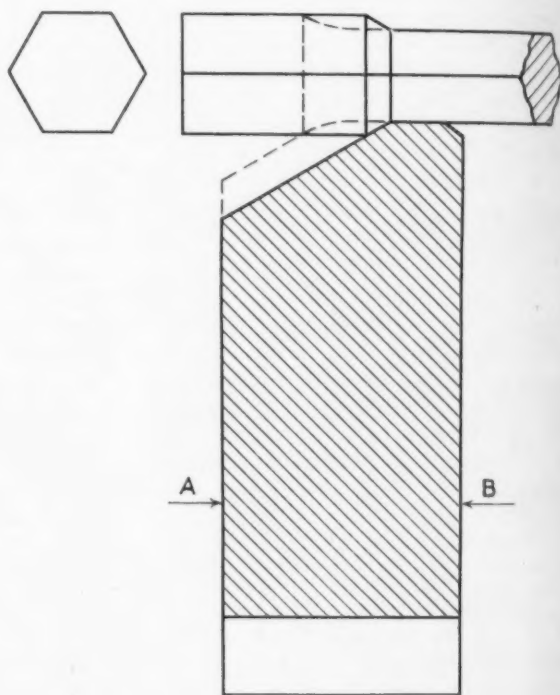
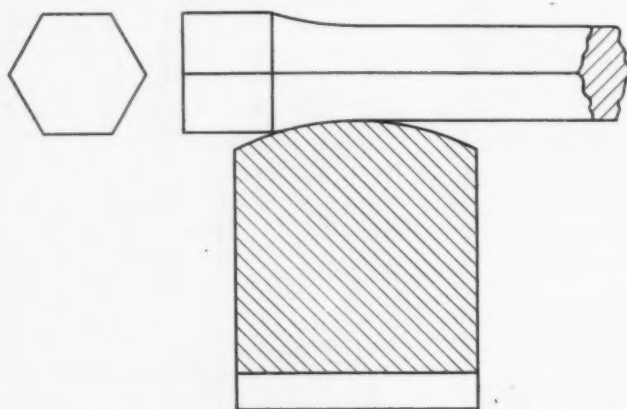
shaped gage having approximately a 0.050 in. taper throughout its length. This gage by being accurately made eliminates any possibility of the die maker filing a twist in the die. In other words, each individual throat and bearing surface is parallel from corner to corner. On return of the die from the hardening room, the die maker proceeds to finish the die by filing it to the size shown in the charts published in *THE IRON AGE* of July 6 for the particular size bar under consideration. By continuing to use the taper gage, the die is quickly brought to size, free from high corners and twist. When finished, the die is ready for immediate use. It is no longer

AT RIGHT
FIG. 6—Two forms of bearings most commonly used in the conventional type of cold drawing die.

• • •

BELOW

FIG. 5—Section of center-bearing die and action which takes place during drawing.



through this die passed from the bar machine, going through no straightening process of any kind, directly to the inspection and there passed without a single rejection due to size or kinks. In drawing thousands of bars of steel, the writer has never had a bar have the slightest kink after passing through a center-bearing die.

By way of comparison, consider how simple it is and how little energy is needed to make a center-bearing die, such as that shown in Fig. 1 (shown in first section). First, the die is punched as before—with this difference—the proper throat angle of 10 deg. is punched in the die from both faces, then the bearing or size point is punched with a punch having an included taper of 0.040 in. to the inch,

radius suitable for all sizes and not necessitate an excessive amount of filing by the die maker. Even in dies where the shape was such as to make punching impossible, this 10-deg. angle was either filed, or machined when possible, into the die and then blended into a radius at the proper time. By blending the 10-deg. throat angle gradually into a radius, the die maker as he works from one face of the die towards the center, and then by reversing the die repeat the same operation, will automatically form the size point location with a radius leading to it and one retreating from it.

The die now has the proper throat and radius bearing roughed out and is ready for hardening. The die maker has used in this process a hexagon

necessary to wait for bars to be delivered on the floor to try out the die.

It is unimportant when the die is finished whether or not the radius extending through the die is a true radius. The important thing is that as the bar starts to draw it is in contact with a radius thus keeping the friction between the bar and the die at a minimum, and, after it passes the size point and the natural swelling of the bar starts to take place, it is supported by another radius throughout the length of this action. The necessity of controlling this swelling of the bar after it has passed the size point of the die is of the utmost importance if the desire is to produce bars which are of uniform size and free from kinks. It is well to remember that,

actually, it is not the die that completely determines the bar size, but the amount of swelling in the bar itself.

In Fig. 5 is shown a section of a finished center-bearing die and the action which takes place in a die of this type. In offering this illustration, a bar having excess draft is used to more clearly demonstrate the gradual reduction in diameter of the bar as it approaches the size point of the die and the even support given the bar after passing this point. It is this gradual reduction of diameter of the bar, bringing the bar nearly to size before it reaches the size point of the die, thus relieving the most important part of the die from excessive pressure and friction, that is responsible for the long life of this type of die. It appears from the illustration shown that the bar has a long contact with the die, but actually such is not the case. When drawing bars of the finished diameter as shown having the proper amount of draft, all this action takes place in a space no longer than $\frac{1}{8}$ in.

For drawing other size bars Table II gives the approximate lengths of bearing surface which have proved satisfactory. If the die maker in blending the throat angle of the die into a radius has used the proper care, it will be found when drawing bars that the draft on the bar approaching the size point and the swell of the bar after leaving the size point will practically establish these lengths.

The writer by using the type die just described in conjunction with the charts previously mentioned worked from two to four weeks ahead of the mill schedule, carrying in stock from 150 to 200 dies of the standard sizes and shapes. This contrasts with conditions under the previous system in one shop, where it was not unusual for jobs to lie on the floor from three to six weeks waiting for dies.

Note that under this system of die construction all guess-work and indecision have been eliminated. The proper throat angle of 10 deg. and bearing are punched. The die maker has been furnished the size to which the die should be made. He has been relieved of all responsibility except that of turning out the most perfect die of which he is capable, and he should turn out such dies in the minimum of time. The die maker should not act as a one-man engineering department, or do the work of a blacksmith. He should be building dies to go into production, not in the scrap barrel.

When it becomes necessary to re-

move such a die from production due to natural wear it is seldom that it need be discarded. There are few shape-dies that cannot be returned to the hardening room and there shrunk by rehardening, taking care in reheating not to pass the critical point of the steel being hardened and thus cause the bearing surfaces of the die to become "barked" (that is, decarbonizing the surfaces). Invariably the natural shrinkage of the steel will cause the hole to close enough to allow the die maker to file it to its original shape and size.

One of the most important features of the die shown in Fig. 1 (shown in

TABLE II
Recommended Bearing Surfaces

Diameter of Bar	Approximate Length of Bearing
$\frac{1}{8}$ to $\frac{1}{4}$ in.	$\frac{3}{16}$ in.
$\frac{1}{4}$ to $\frac{3}{8}$ in.	$\frac{1}{4}$ in.
$\frac{3}{8}$ to $\frac{1}{2}$ in.	$\frac{3}{8}$ in.
$\frac{1}{2}$ to $\frac{3}{4}$ in.	$\frac{7}{16}$ in.
$\frac{3}{4}$ to 1 in.	$\frac{1}{2}$ in.
1 to $1\frac{1}{2}$ in.	$\frac{5}{8}$ in.
$1\frac{1}{2}$ to 2 in.	$1\frac{1}{16}$ in.
2 to $2\frac{1}{2}$ in.	$\frac{7}{8}$ in.
$2\frac{1}{2}$ to 3 in.	1 in.

first section) is the admirable way in which it lends itself to this operation time after time without developing "cracked corners." The natural tendency of a disk such as used in making solid dies upon being quenched while in the hardening process is to contract toward the center. In the type of die shown in Fig. 1, the bearing or size point receives the full benefit of this action without setting up any unnatural strain in the die. Whereas the die shown in Fig. 3 (shown in first section), has no established central point within the shape itself over which this action can be distributed, the action is transferred from the natural receiving point and is extended throughout the thickness of the die to the face having the smallest opening. In this case it is face "B," and there is set up an unnatural internal strain in the die which often results in cracks forming at the junction point of any corners in the shape itself and the face of the die, rendering the die unfit for use.

It is not unusual in this type die (that of Fig. 3) to see a die concaved at face "A" as much as $\frac{1}{4}$ in. at the center and on face "B" a nub will be found extending outward an equal distance. This nub often carries the bearing or size point of the die, which accounts for breaking away at the face of the die. One center-bearing die, a 0.750 in. hexagon used in draw-

ing steels of a Brinell hardness ranging from 190 to 240, has been kept in production two years, making nine trips to the hardening room before being ruined by an inexperienced operator trying to draw a bar which had not been broken down. This particular die actually acquired an individuality, and was known throughout the department as "shatter-proof." Of course this die was an exception, but it is no exception for a die of the center-bearing type to make five and six trips to the hardening room before the limit of its usefulness is reached. At times it has been necessary for the writer to depend upon the type of die shown in Fig. 3 to complete a certain job and at such times the dies would be nursed along as a mother would a child; not once, however, has such a die returned from its third trip to the hardening room without cracked corners.

In discussing the subject of solid dies, no mention has been made of dies used in cold drawing wire or the heavier rounds that are drawn on drums. In some mills dies for this type work are made by the hundred out of ordinary tool steel. At best they enjoy a short life, and very often the steels drawn through them are of inferior finish and accuracy. The high speed at which these steels are drawn in present day production should eliminate from consideration any but Carboly dies for this type of work. No other type of die can hope to compete with them in this field. However, if the abuse to which they are subjected were discontinued their record would be surprisingly better. There is a deplorable habit in some mills of regarding the Carboly die as a cure-all, and a large percentage of the jobs on which they fail to function properly should be charged against the regrettable practice of forcing them to draw steel improperly processed for cold drawing. The mistaken opinion that these dies are indestructible is often heard in the excuse, that is a Carboly die is supposed to "draw anything." There is much to be said in favor of using Carboly dies in shape-work, but to consider substituting Carboly dies for all standard shape-work is not only impractical but the cost would be prohibitive. Low cost of the tool steel shape-die and its flexibility in allowing the die maker a wide range of freedom in quickly making any changes necessary in size or shape places this type die far in the lead for general shape-work, at least until the cost of Carboly dies are much lower than they are at present.

HANDLING COSTS



A NATIONALLY prominent manufacturer of small metal parts has recently revamped its entire system of materials handling whereby, among other things, it is now possible to unload box cars containing 30 tons of wire in an average of 65 min., which is less than one-twentieth of the former unloading time. This includes weighing and storing. Reclaiming and delivering for production purposes has been similarly simplified.

The material handled is coiled wire packed in drums for protection against abrasion, which is an essential requirement for later processing. Numerous grades and types of wire are used, making storage facilities essential whereby the desired quantity of a specific item may be withdrawn without delay and without moving stocks of other grades.

The first step in attacking this handling problem was to devise a unit

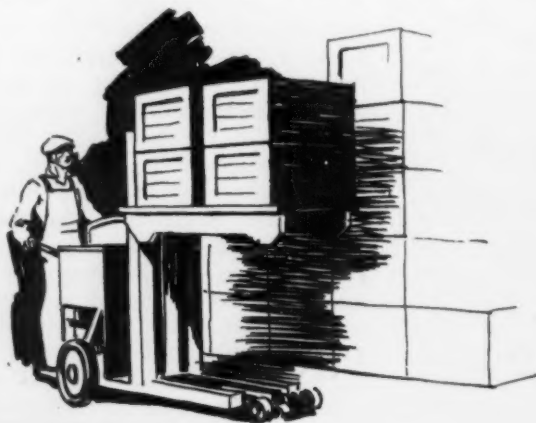
consisting of two drums and a metal pallet having a 5-in. floor clearance. Drums and pallet are welded to form a single rigid structure. These units, containing 1000 lb. of wire each, are shipped in box cars directly from the plant of the wire manufacturer. The cars are loaded by the customary method of packing in each end, then the center, with one unit in front of the side door before sealing the car. At the plant receiving dock a power fork tiering truck empties the car by taking out the pallet and drum units in rapid succession. No manual operations are required, as will be seen from Fig. 1.

The average length of truck haul between loading dock and raw storage is about 75 ft., and the greatest dis-

tance 150 ft. All of the units are weighed on platform scales located in the line of travel so that only a very short time is required for this operation. The raw storage room has a capacity for 300 tons of wire.

Just inside the door the truck is stopped long enough for two men to remove the friction lids from the drums in order that laboratory samples may be taken from each. The lids are then replaced and the units taken in to the racks.

The distinguishing feature of this manufacturer's materials storage system is the installation of racks fabricated from light structural steel and welded on the job. They reach from floor to roof and are divided into



LEFT

FIG. 1—Use of power elevating fork truck for unloading box cars of drum and pallet units for transportation to storage racks. All photos courtesy Elwell-Parker Electric Co.

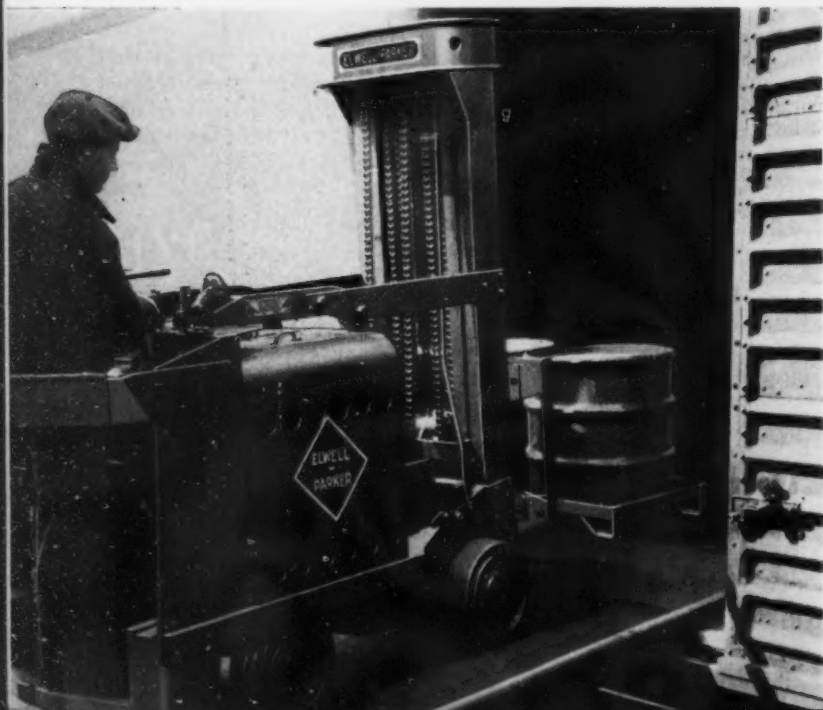


FIG. 3—Electric coils of wire

REDUCED

By FRANCIS A. WESTBROOK
Consulting Engineer, Benson, Vt.

parallel compartments, or aisles, just wide enough to be entered by the tiering truck with pallet and drums on the forks. Shelves have been provided by welding pairs of angle irons at the proper heights along the sides of each compartment. These compartments are at right-angles to the main aisle and are loaded by the operator, who gives the truck a quarter turn and elevates the load to a vacant shelf. The structural steel shelves and method of loading them is clearly shown in Fig. 2.

Clearance between the supporting angle irons and the steel pallets is just sufficient to permit of pushing the latter by truck power to the extreme rear of each storage compartment, and

withdrawing them for production by the same method. In order to effect tiering and to increase the usefulness of floor space, parallel lines of angle irons have been welded to the main frames at various heights far enough apart to allow three levels for storing with ample clearance for placing and withdrawing.

This arrangement makes maximum use of the cubic capacity of the raw storage building and is also of such a character that it is a simple matter to increase the storage facilities at any time by extending the racks. It furthermore makes easy work of classifying the various grades of wire so that any grade may be withdrawn without disturbing any of the others. Finally,

this compact and efficient storage system provides wide aisles for the unhindered movement of load-handling vehicles and other traffic.

Prior to installing the present system the company stored its coiled wire in vertical bins made by setting steel pipes into the concrete floor to form a series of squares small enough to keep the coils in vertical stacks. At that time wire was received from the suppliers in single drums, unmounted, which were taken from freight cars, one at a time, on hand trucks and the coils taken out. The coils were then hoisted by an electrical piler, dropped sidewise by hand, turned over one coil at a time and stored flat. Since the process of withdrawing for production involved corresponding motions the damage to the goods was rather costly. Furthermore, the storage of empty drums prior to their return presented something of a storage problem because they occupied the same amount of space when empty as when filled.

With the present system the wire remains in the drum-pallet unit until needed for manufacturing. The reclaiming of coils from the racks is merely the reverse of putting them in and is done with the electrically oper-

BELOW

FIG. 2—Welded steel framework shelves. Tiering truck is shown here storing drum and pallet units.



Electric platform truck drawing a train of five dollies with 500 lb. per dolly.



ated truck with equal speed. The drums are then opened, the contents removed by hand and loaded on small dollies provided with a vertical standard to keep the coils in place while traveling. Loss due to damaged wire has been practically eliminated.

Trains of five dollies, each carrying 500 lb. of wire, are drawn, as in Fig. 3, by an electrical platform truck, serving as a tractor, to the first manufacturing operation. These platform trucks also are used as tractors to

transport buckets of small parts on trailers built for the purpose and each capable of handling 1500 to 1800 lb.

A considerable volume of preformed aluminum is used which is delivered in wooden cases and tiered and stored until needed on steel racks corresponding to those already described. The manner of handling is about the same.

The management of the company summarized the advantages of its new system of handling incoming materials, which involves the most impor-

tant step in materials handling here, as follows:

- (1) Greatly increased speed in unloading.
- (2) Increased safety due to mechanical handling.
- (3) Saving in labor—five to eight men were formerly required to unload a car whereas now two men handle 40,000 lb. per hr. without manual labor.
- (4) Great increase in storage space without increasing use of floor space.
- (5) Faster delivery to production machines.
- (6) Greatly reduced damage to raw stock.

Electrical Coordination Featured In Bethlehem Hot Strip Mill

IN order to secure high speed, low cost and maximum flexibility, the new Sparrows Point, Md., hot strip mill of the Bethlehem Steel Co. is so coordinated in electrical and mechanical design that each unit has a definite relationship to every other unit in the over-all job of producing steel. The mill has already turned out long runs of tonnage at 2000 ft. per min. that meet most rigid and special requirements.

All the electrical apparatus for the mill was designed and built by Westinghouse Electric & Mfg. Co., and the equipment is said to incorporate features new to hot strip production. All four stands of the roughing train are driven by synchronous motors, of

3000 hp. each. As compared with induction-motor and flywheel drive, more commonly used for roughing stands, the synchronous motor drives are said to be simpler and considerably more efficient, and the cost installed was lower.

Ahead of the roughing train are two vertical rolls used to break the scale on the slabs as they leave the furnace. These rolls are driven by a small-sized twin-motor system—a 300-hp. squirrel-cage motor being connected directly to each roll. The use of individual motors eliminates mill housing and gearing.

The finishing train is driven by six

3000-hp. and one 500-hp., 600-volt, direct-current motors. Accurate control of rolling speed is a major factor in determining the quality of the finished product. The accompanying illustration shows the runout table motors.

A rather unusual ventilation system keeps the motors and the motor room properly cooled—even in the warmest weather. Instead of the machines expelling heated air into the motor room, cool air is delivered to the room by the cooler. This air is then drawn into the machines, and at the commutator ends goes down into the basement below. Here water coolers extract the heat and return the air to the motor room.



NEW DESIGNS IN MACHINE TOOLS

By FRANK J. OLIVER

Associate Editor, *The Iron Age*

THOUGH special purpose in character, a new rifle reaming machine incorporates a new principle in machine design that should find wider application. Other machines mentioned in this month's review of announcements of the manufacturers include a new size of Blanchard surface grinder, a special purpose broaching machine with innovations in tooling, a detachable grinding unit for both internal and external work, a new type of honing machine, a center lapping machine, a new size of automatic lathe, a band sawing machine and a large size Superfinisher for tractor engine crankshafts. Among accessory equipment are found air and hydraulic cylinders and valves, and an oil filter for machine tool application.

RIFLE barrels can be finished reamed at approximately one-sixth the cost of the same operation with previous methods, according to the *W. F. & John Barnes Co.*, Rockford, Ill., which has recently completed a highly productive rifle reaming machine. One operator can turn out in an hour about 100 rough, semi-finished and finish reamed barrels in any bore from 22 to 50 caliber. Stroke and fixture are adjustable to accommodate barrels ranging in overall length from 24 to 32 in. The machine combines electrical and hydraulic controls.

Chief feature of the unit is the automatic method of retrieving the specially designed reaming tools after they have been pulled through the bores. The arrangement is shown best

in the diagrammatic sketch. The central trunnion fixture is octagonal in shape, with alternate banks of six rifle barrels and reamer return tubes. After the reamers have been pulled through the bores by the right-hand head, spindle rotation stops and the trunnion is hand indexed 45 deg., bringing the return tubes into position opposite the reamers. The right-hand head then rapidly approaches and pushes the reamers through the return tubes to the opposite end where they are automatically picked up by the left-hand and pulled clear of the fixture, so that the trunnion can again be indexed. With the rifle barrels in the working position, the left-hand head is then rapid traversed toward the fixture to a point where the right-hand head chucks can grasp the long pilots

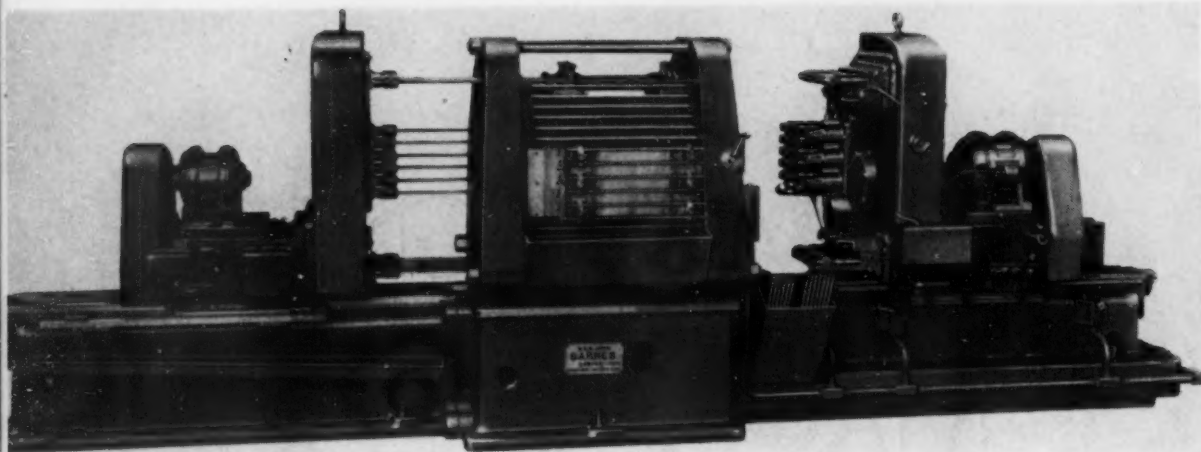
and pull the reamers through again. Loading and unloading is performed during the cutting time to insure maximum production.

Two self-contained hydraulic sliding heads are used on this machine, both provided with feed and rapid traverse. Only the right-hand head incorporates spindle drive. Hydraulically actuated chucks are utilized on the 18 driving spindles. Spring type chucks are used for picking up the reamers on the left-hand head. Barnes standard pumps and hydraulic controls are featured. The machine is controlled with four push buttons and one lever, and electrical interlocks are provided to prevent damage to work.

Coolant is applied directly to the cutting edge of the reamers through the center of the pilots on the reaming tools. Supply of coolant under high pressure is through the feed collets on the right-hand head. Use of high pressure washes out all chips and prevents damage to the finished bore. Although this is a highly special machine, machines of similar design can be supplied to meet specific requirements of other industries.

Surface Grinder

THE *Blanchard Machine Co.*, Cambridge, Mass., announces an entirely new small surface grinder, the No. 11, which supersedes the No. 10 Blanchard grinder. The new machine

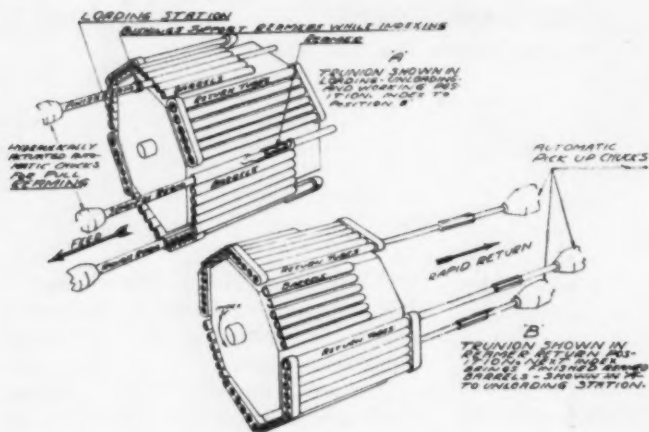


AT LEFT

BARNES high production rifle reaming machine recently installed in a firearms plant provides means for retracting the reamers through sets of return tubes.

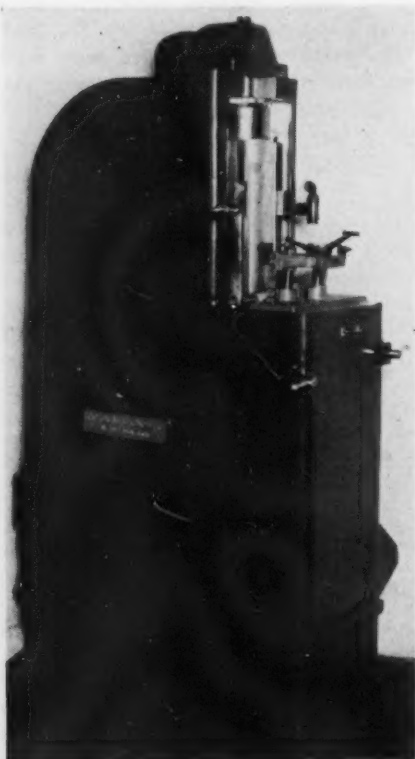
BELOW

DETAILS of the octagonal shaped trunnion fixture used on the Barnes rifle reaming machine, showing the three work stations for rough, semi-finish and finish reaming and the three alternate banks of reamer return tubes.



BELOW

IN this special Colonial machine, designed for broaching keyways in the taper holes of steering wheel hubs, when the broach reaches the bottom of its pull-down stroke, the ram trips a release which causes the work holding cradle to lift up under spring pressure at an angle away from the work. After reloading of the fixture, the ram returns to the top of the stroke, the broach passing through the work without touching it, due to the angle offset of the fixture. The work cradle is lowered into operating position manually against spring pressure, locating the parts (two) over a keyway horn and broach guide. Stroke is adjustable by means of trip dogs. With this arrangement, the broach always remains in the puller.

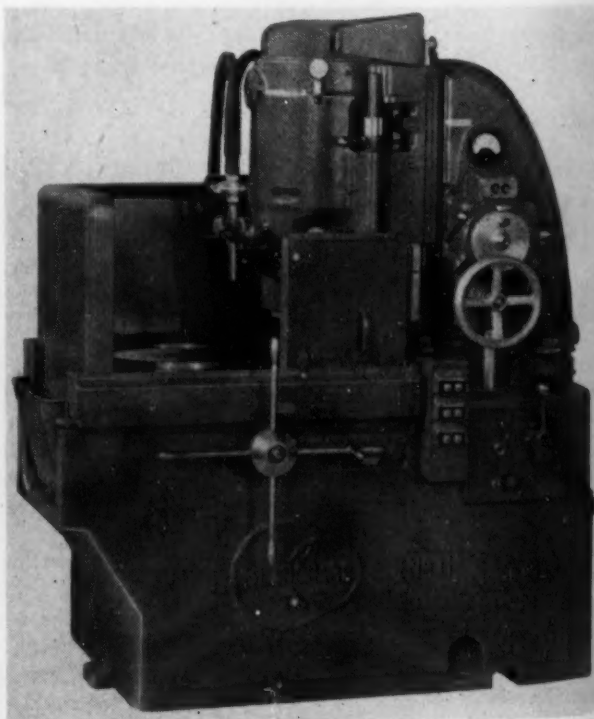


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ABOVE

INTERCHANGEABLE internal and external grinder spindles for the type BPA precision grinders, made by the Standard Electrical Tool Co. for application to lathes, planers, boring mills and milling machines.



ABOVE

THE new No. 11 Blanchard grinder is of greater capacity and more powerful than the No. 10 size which it supersedes. Compact in size, however, it has an overall length of only 63 in. and width of 42 in.



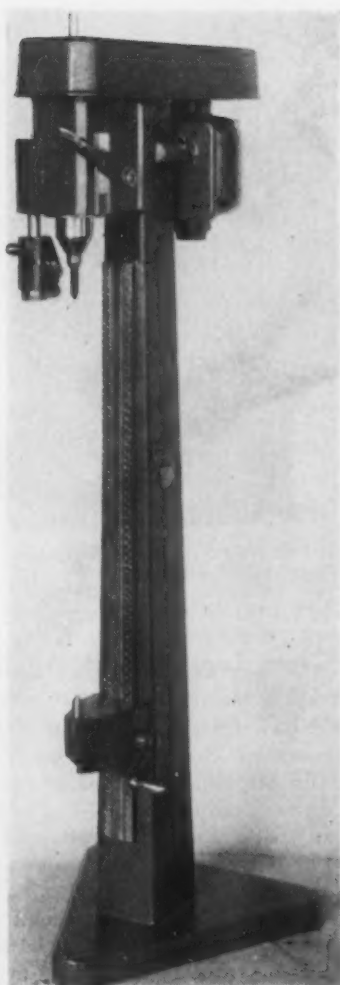
AT LEFT

ALL the operating mechanism is contained within the base of this unconventional type of honing machine, offered by the newly formed Honing Equipment Corp., Detroit.



BELOW

THE improved Ex-Cell-O center lapping machine laps 60-deg. centers up to 15/16 in. diameter in work up to 10 in. diameter by 36 in. long. With a special column, work up to 84 in. long can be lapped.



AT RIGHT

MODEL R-14 is the newest and largest size in the line of Lo-Swing automatic lathes, made by the Seneca Falls Machine Co., Seneca Falls, N. Y. It incorporates an all-mechanical quick changeover mechanism which makes it possible to change the stroke by the simple setting of a graduated dial. This lathe handles heavy multiple tool turning of work 10 to 11 in. in diameter and up to 36 in. between centers. The machine illustrated is equipped with a special motor driven tailstock to provide long travel. It can be equipped with a third, overhead tool slide.

electrical control apparatus is mounted in one cabinet in the rear of the base.

Detachable Grinders

STANDARD Type BPA precision grinders, developed by the Standard Electrical Tool Co., 1946 W. 8th St., Cincinnati, can be furnished for both internal and external grinding by means of interchangeable spindle units. These grinders are available in sizes ranging from 1/4 to 10 hp., for application to lathe, planer, boring mill or milling machine.

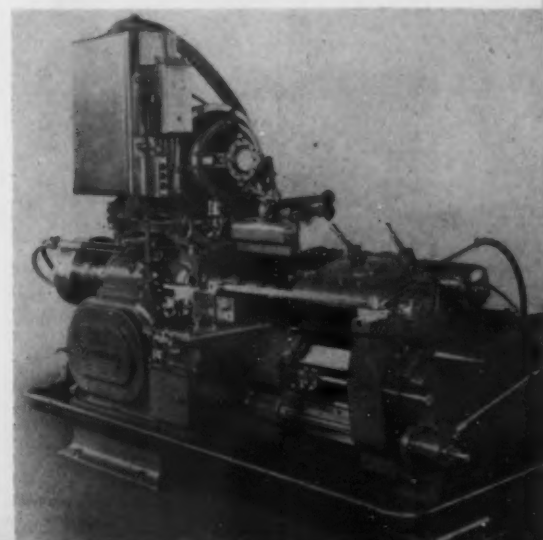
Power is transmitted from the motor to the grinding spindle by means of a belt drive. Grinding on centers is accomplished by means of vertical hand adjusting screw for the spindle assembly.

Either an open or an enclosed type of internal spindle assembly can be furnished, these being interchangeable and available in various lengths to meet diversified requirements. The spindle assembly is held in position by two clamp screws and can be removed from the housing as a unit. A slot in the spindle housing accepts a dowel on each spindle unit, assuring a definite location for the spindle and minimizing changeover time.

Honing Machine

MANY innovations are found in a new type of honing machine, offered by the Honing Equipment Corp., 4612 Woodward Avenue, Detroit. The spindle operates vertically through the work table and speed changes for the reciprocation and rotation of the spindle are made easily by the turning of two convenient knob controls. The push button control switch has a stop, start and inch button. Without stopping the motor, the spindle may be stopped either by a hand lever or a foot pedal. It may be restarted by the hand lever only, however.

All of the operating mechanism is located within the cabinet type base,

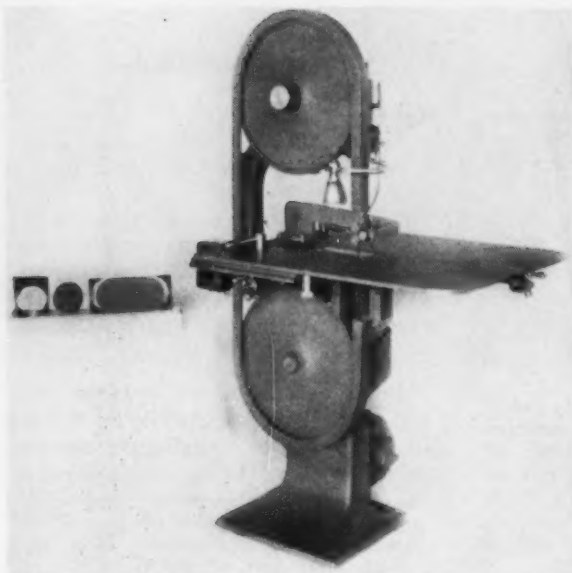


considerably surpasses the No. 10 in capacity, power and rigidity and is capable of fast work. Its larger wheel operating at a lower wheel speed results in faster but cooler grinding with less wheel wear. In its design special attention has been given to ease and speed of handling and all controls are conveniently placed for quick operation with a minimum of effort.

The No. 11 Blanchard grinder uses a cylinder wheel 11 in. outside diameter, 5 in. deep and 9 in. inside diameter driven by a 15-hp. induction motor mounted directly on the wheel spindle and has a capacity for grinding work up to 20 in. diameter by 8 in. high under a new wheel. It is driven by a total of four motors, each direct coupled to its load. One of these motors provides for rapid raising and lowering of the wheelhead by power, with push button control.

A new and improved type of feed gear box provides easy and sensitive hand feeding, also power feed at rates varying from 0.004 to 0.070 in. per min., with automatic stop. The feed and the rapid raising and lowering of the head are interlocked. Features common to other Blanchard surface grinders such as one-piece steel magnetic chuck, three-point adjustable column support, and easy cleaning base are incorporated in the No. 11.

The base of the machine serves as a tank for the coolant and has a capacity of over 75 gal. In an extension of the tank at the back of the base is the motor driven centrifugal pump supplying water to the inside of the wheel and to an outside nozzle. All



AT LEFT

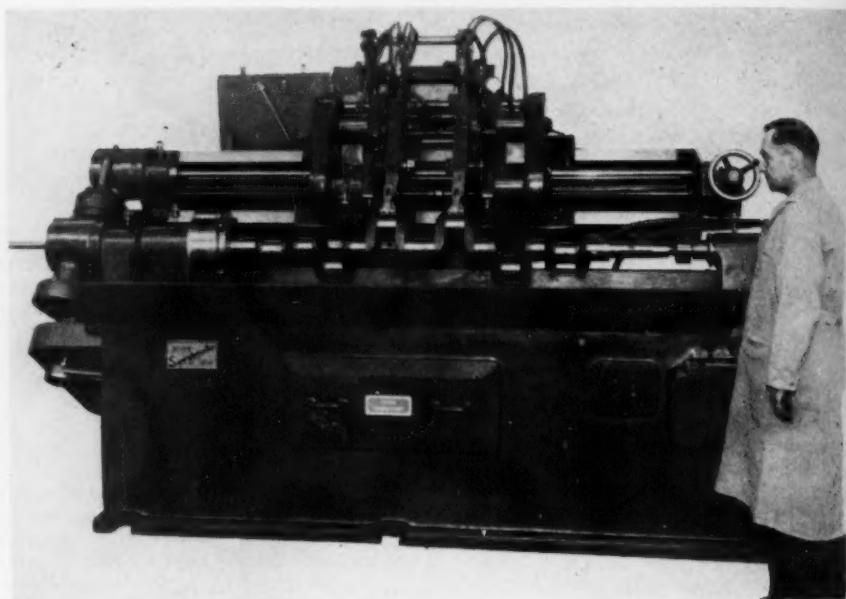
AN overarm carrying a screw adjusted center to engage a centerpunch mark enables arc of circles from $\frac{3}{4}$ to $4\frac{1}{2}$ in. radius to be cut on this type JMR-20 metal cutting bandsaw, made by Wm. Laidlaw, Inc., Belmont, N. Y. Provision is made for sliding the table in two directions at right angles. Machine is powered by a 1-hp. motor and has two cutting speed ranges of 50 to 365 ft. per min. or 100 to 725 ft. per min. Frame, saw wheels, guide arm and table are Meehanite metal. Blades range from $\frac{1}{4}$ to $\frac{3}{8}$ in.

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BELOW

LARGE crankshaft Superfinisher recently installed by the Foster Machine Co. in a leading tractor plant. Another machine has also been installed for Superfinishing main bearings. Both machines are universal and are adjustable for various lengths of cranks. The Superfinishing heads operate simultaneously and are adjustable laterally, also radially to accommodate the throws of the crankshaft in the example of the pin machine. Fluid motors are used for oscillating the Superfinishing heads and the cycle is fully automatic. Finish is in the range of 2 to 3 micro-in.

as is the coolant reservoir. Everything is left clear above the work table for the attachment of any kind of fixture. In the table top are coolant drains leading to a filtering device. The protruding spindle is of the spline type, with ample bearings and protected against grit and moisture. The machine shown is equipped with a 1-hp. motor and has reciprocating speeds of 700 to 1000 cycles per min. and rotational speeds from 0.9 to 27 r.p.m. These speeds were selected for a special purpose, and while the ratios between the rotation and reciprocation are out of the ordinary, they indicate the wide variety of combinations that can be obtained. Resulting abrasive marks are practically parallel to the length of the bore. The mechanism is capable of honing bores up to 2 in. diameter.



Center Lapping Machine

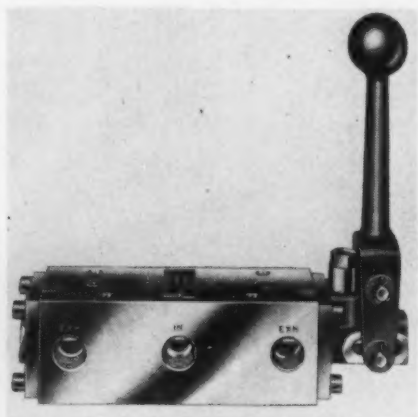
FEMALE centers in parts to be held on centers and to be ground on the outside diameter are quickly lapped on an improved type of machine announced by *Ex-Cell-O Corp.*, Oakman Boulevard, Detroit. The part to be lapped is placed on a vertically adjustable work rest and is held by hand while the rotating lapping stone is brought down by hand lever. Spindle is mounted in Ex-Cell-O precision ball bearings and is carried in a hardened and ground bushing, free to slide vertically and counter-balanced. Four-step pulleys on the spindle and driving motor give lapping speeds of 700, 1300, 2500 and 4650 r.p.m. When needed a diamond lapping stone dresser can be swung into position, a rack and pinion motion being used to

advance the diamond point across the stone at a 60-deg. angle.

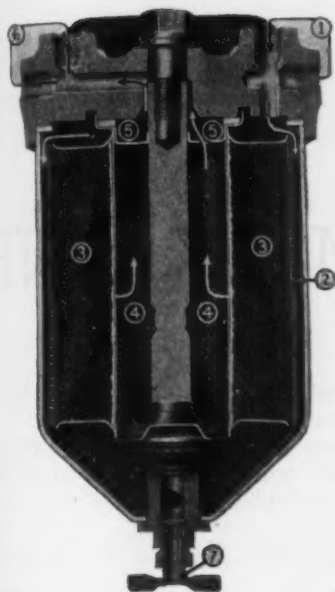
Improvement in Air and Hydraulic Cylinders

THE Tomkins-Johnson Co., Jackson, Mich., is now hard chromium plating the inside of the tubing bodies of its non-rotating cylinders for compressed air and hydraulic use. The bodies are first honed in the usual way, then chrome plated to a thickness of 0.001 in.

Cylinders not in use ordinarily are subject to rust if left for any appreciable length of time. With the hard chromium plated bodies, moisture from condensation or water itself in the example of water hydraulic cylinders acts as a lubricant, increasing the



QUICK-AS-WINK air or hydraulic valves with single plunger construction are made in 25 styles of valve control and in sizes from $\frac{1}{8}$ to $1\frac{1}{2}$ in. nominal pipe size. A product of C. B. Hunt & Son.

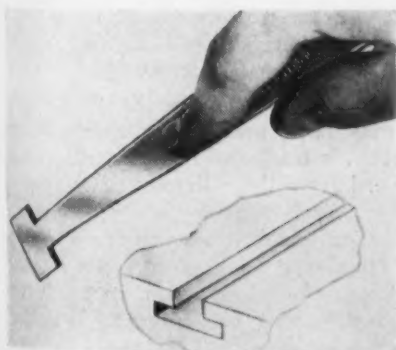


FOR the protection of bearings used on grinders, automatic screw machines and other machine tools, this type T-1 oil filter has been developed by the AC Spark Plug division of General Motors. It removes all solid impurities, such as fine metal chips. In the illustration, inlet is at 1; 3 is the lagoonite filtering element and 4 is the brass collecting tube into which the clean oil flows before being discharged at 5. Accumulated dirt and water in sump is drained at 7.

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slickness of the surface instead of detracting from it. The outside diameter of the piston rod is also hard chrome plated to effect the same lubricated action at the packing.

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A PLANER slot cleaner, for removing the metal chips from the table slots of milling machines, planers and other machine tools, is now being offered for free distribution by the Dayton Rogers Mfg. Co., 2830 S. 13th Avenue, Minneapolis. This handy tool is die cut from hard cold rolled strip steel, fully plated to prevent rusting. The handle is provided with a hole for hanging in the tool crib, or, may be chained to the average machine tool.

Single Plunger Valve

SIMPLICITY in design is the chief feature of a new line of single plunger valves for air or hydraulic service, recently announced by C. B. Hunt & Son, 1933 E. State Street, Salem, Ohio. By having individual exhaust ports controlling each end of a double acting cylinder, speed control of the power piston is easily obtained

independently in either direction. The Quick-As-Wink patented valve principle is used in this design. There is no metal-to-metal contact and the higher the pressure, the tighter the seal. The most commonly used sizes have extruded brass housings. With outlets and inlets in the sides, servicing can be handled without dismounting the valve from the application.

TRADE NOTES

Two new licensees have recently been appointed by New Wrinkle, Inc., Dayton, Ohio, for the manufacture of Wrinkle Finishes under the patents held by the company. They are the Paraffine Companies, Inc., San Francisco, and Buckeye Paint & Varnish Co., Toledo, Ohio.

Crane Co. has been appointed national distributors of Chiksan swing joints, according to Earle R. Atkins, sales manager, Chiksan Tool Co., Fullerton, Cal. Crane Co. will also handle barge and dock hose and other Chiksan products.

The Citizens Gas & Coke Utility, the municipally-owned manufactured gas system at Indianapolis, Ind., has ordered a Koppers Seaboard Process liquid purification plant for its Prospect street works.

American Enameled Products Co. has moved its general offices, manufacturing facilities and personnel from Mt. Pleasant, Mich., to Waukesha, Wis.

Foreman, Inc., was organized Aug. 1 as a selling agency for the Foreman line of axle and drive shafts. The Brandt-Warner Mfg. Co., York, Pa., will handle all factory production of this line. W. D. Foreman will continue the manufacture of Foreman trailer axles at 54th and State Streets, Chicago.

Ryan Engineering Co., 5244 Germantown Avenue, Philadelphia, has been organized by F. J. Ryan, formerly chief executive in charge of sales and engineering for the R-S Products Corp., to provide a sales engineering service.

Metallizing Co. of America, Inc., has opened a sales and service office at 602 Academy Building, Newark, N. J., in charge of William McMakin.

Webster Mfg. Co., Tiffin, Ohio, manufacturer of materials handling equipment, has appointed Fessler & Co., Pittsburgh, as agents in that territory.

R. C. Neal Co., Buffalo, has been appointed district distributors for the Progressive Welder Co., Detroit, maker of Progressive welding machines and equipment.

Bendix Aviation Corp. has acquired a license from Linderman Devices, Inc., in connection with the production and sale of a new aircraft brake already adopted as standard equipment by leading aircraft manufacturers. Other licenses granted by Linderman Devices include: Timken-Detroit Axle Co. for the exclusive manufacture of fluid and air operated brakes for commercial and military vehicles, and Westinghouse Air Brake Co. for exclusive sales rights on air-operated Linderman brakes for commercial vehicles. Packard Motor Car Co. also has a non-ex-

clusive license for the production of Linderman brakes for passenger cars of its own manufacture.

FINANCIAL NOTES

Ohio Seamless Tube Co., Shelby, Ohio, reports net profit of \$61,832 for the first six months of 1939, compared with net loss of \$79,115 in the corresponding 1938 period. W. C. Connelly, president, said sales were 65 per cent ahead of the first half of last year. Current assets of \$1,191,422 compare with \$1,016,144 a year ago, while current liabilities of \$114,531 compare with \$68,499 last year.

Pittsburgh Screw & Bolt Corp. reports for three months ended June 30 a net loss of \$41,350 compared with a loss of \$129,759 in the June quarter of 1938. For six months ended June 30 indicated loss was \$49,476, compared with a loss of \$227,014 in the first half of 1938.

Pittsburgh Coke & Iron Co., and subsidiaries, reports for the June quarter net profit of \$36,252, or a little over one cent a share on the common, compared with \$47,838, or 4c. a common share, in the 1938 period. For six months, net profit was \$130,279, or 13c. a common share, compared with \$125,527 in the 1938 period.

A. M. Byers Co. reports for June quarter net profit of \$173,372, equal to 28c. per common share, against net loss of \$81,916 in the June, 1938, quarter.

The Keystone Steel & Wire Co., Peoria, Ill., reports for the fiscal year ended June 30, 1939, net profit of \$897,299 after all charges including federal income taxes, compared with net of \$727,543 for the preceding 12 months. Net sales for the year amounted to \$11,040,319 against \$9,648,839 for the previous 12 months, an increase of 14.4 per cent.

Largest Blast Furnace In Britain Started

LONDON—The largest blast furnace in Britain was put into service late in July by the Appleby-Frodingham Steel Co., Scunthorpe. The furnace is almost twice as big as the average blast furnace in the United Kingdom, and is capable of producing 3500 tons of pig iron per week, using the local Frodingham ironstone. If the new furnace were smelting American ores, which have a much higher iron content, it would be capable of turning out 1000 tons of pig iron per day.

THIS WEEK

ON THE

By W. F. SHERMAN

Detroit Editor

ASSEMBLY LINE

... New safety glass, with optic qualities, announced by Libbey-Owens-Ford ... G.M. strike settlement permits resumption of work on 1940 models ... Die makers' wages up to \$1.30 per hour in some plants, a 5c. rise ... Mercury to be built at Lincoln plant; Zephyr is massive streamlined car ... Production total due to climb in week; nears bottom at 28,250 units.

DETROIT—Announcement of a new type high-test safety glass was made Monday by Libbey-Owens-Ford Glass Co., Toledo, in conjunction with Fisher Body division of General Motors Corp., which will use the new material in the windshield and side windows in 1940 model cars. Coincidentally, results of tests were revealed which indicated that fire-polished sheet glass has been the cause of headaches, eye fatigue, and accidents.

Polyvinyl acetal resin, crystal clear, stretchy and tough, and one of the modern plastics to which industry has been looking, is the binder sheet in the new laminated safety glass. It is so tough that, when the glass is broken by impact, the vinyl interlayer stretches several inches before it tears apart. Thus it takes its place with the accepted materials which are now making automobiles safer and more use-

ful, not as a substitute for any other kind of material, but as a bond which makes glass a more satisfactory material in its applications.

The laminated safety plate glass is rated a distinct improvement over laminated safety sheet glass which has been used largely in side windows in recent years, and frequently in replacement windshields.

Sheet, because it is fire polished, has a wave-distorted surface which distorts objects viewed through it, particularly in motion, which accentuates the distortions. Comparisons made in a series of tests in the last 10 months show that passengers, looking through sheet glass beside them, suffered 62 per cent more eye fatigue than when looking through plate glass, where there is no effect from wave form in the surface. The ability to judge depth differences (relative distances) through moving plate glass was re-

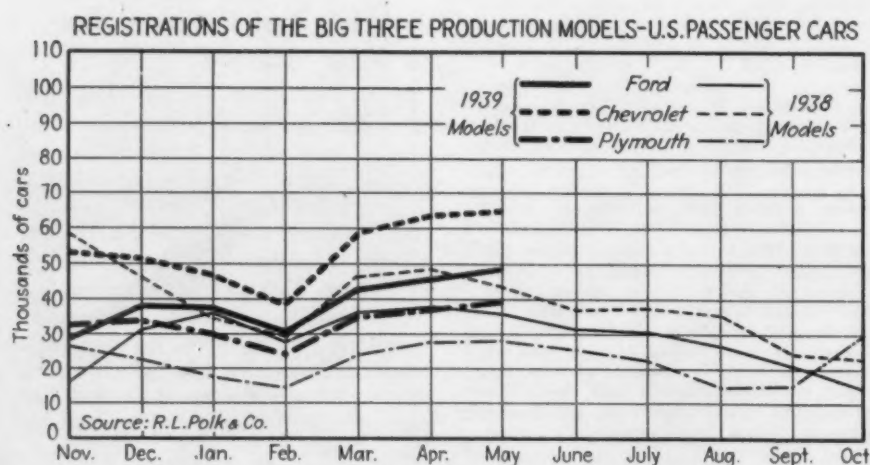
duced 81 per cent when looking through sheet glass. Headaches were shown to be 140 per cent more frequent, and ability to read signs was reduced 13.9 per cent in comparative tests.

In shatter-proof qualities, the new glass was shown to be able to withstand impact of a 9 oz. steel ball dropped 84 ft. When fracture did occur, the plastic was demonstrated to be much more effective than present interlayers in safety glass. It will actually hold pieces of broken glass together as on a rubber sheet. The plastic remains strong and flexible at all temperatures and under all weather conditions.

Polyvinyl acetal is entirely transparent, and in manufacture of the glass it is handled in sheet form. It is placed between two precision polished panes of plate glass, each less than $\frac{1}{8}$ in. thick. The "sandwich" is subjected to high pressure under a bath of hot oil, so the materials are integrated into what appears to be a single clear pane, clearer than the ordinary safety glass. To develop the materials and equipment, five firms cooperated: Libbey-Owens-Ford; Carbide & Carbon Chemicals Corp.; E. I. du Pont de Nemours & Co., Inc.; Monsanto Chemical Co., and Pittsburgh Plate Glass Co., spending approximately \$6,000,000.

In its optic qualities, the glass is entirely new; and, as laminated safety glass, it marks an important step forward from the cellulose acetate types introduced in 1933 and the cellulose nitrates which were used earlier. The nitrate type is the one which turned brown and clouded on exposure to moisture and the actinic rays of the sun. Incidentally, laminated safety glass has only been used as standard equipment in windshields for a little more than a decade, first being offered as original equipment in 1928. By 1934, it was standard equipment "all around." Its earlier uses were in aircraft and in gas mask goggles, but cost up to 1924 was \$10 to \$12 per sq. ft.

Settlement of the General Motors tool and die strike came last week in





The Three-Spindle Keller Machine is ideally suited for the production of multiple parts with irregular outlines. In the illustration at the left the finished connecting rods on the machine table were profiled three at a time from solid bar stock. The tracer follows the template outline for machining the outer edges. A second template is then mounted on the fixture pins for machining the inner channels. The average total time per piece for machining the outer edge, the bosses on the ends, and the channels on both sides, including handling time, is two hours, 33 minutes.



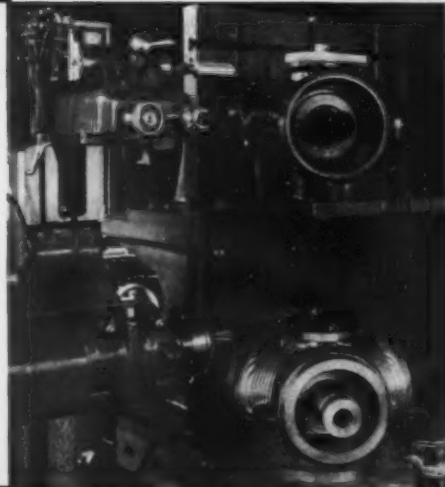
The men who build aircraft use the KELLER Machine!

THE Keller Automatic Tool Room Machine, because of its versatility, is now in use in almost all the major aircraft plants of the world. Because it can reproduce complicated shapes easily, it has solved many difficult aircraft problems. Engine parts, propeller hubs, landing gear components, and many other parts have been worked out experimentally on this machine, and later the complicated dies have been produced accurately in the same way, ready for production.

The operating principle of the Keller Machine is the accurate reproducing in steel of a master shape made of wood, plaster, cement or similar materials. Under electric control a tracer glides lightly over the model's surface, or rides around the profile of a sheet

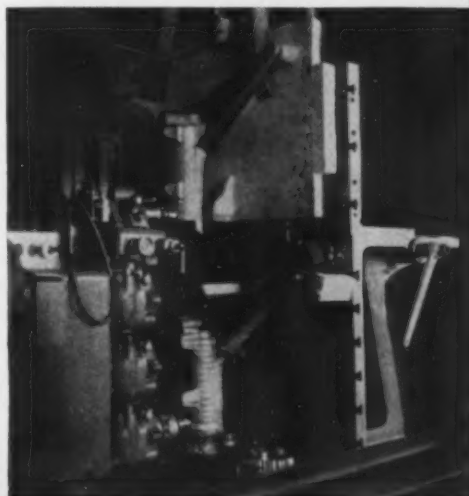
metal template, while the milling cutter reproduces this shape accurately.

For quick, economical, accurate production of complicated experimental parts, finished dies and a long list of similar parts, the Keller Machine is the ideal method. Write today for complete information.

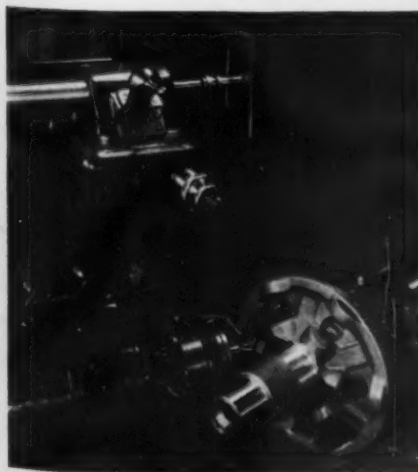


Above is an experimental three-blade propeller hub as it appears after the roughing cut on the Keller machine. The circular bosses and shafts were first turned on a lathe from a solid block of steel. This then was mounted on the Keller machine and the connecting surfaces were produced under the control of the tracer which follows the contour of the wooden model mounted above. To obtain uniform cross section, the work piece was indexed for each surface, so the same section of the model was reproduced three times.

At the left the Keller machine is producing an experimental landing gear part which it is cutting from a solid steel billet using a wooden model as a guide. When this piece is removed from the Keller machine it will be the equivalent of the forging eventually to be produced with dies. This piece can be checked for stresses and strains and used to lay out subsequent machining operations.



At the left is shown the operation of milling bevel gear openings in a speed reducing unit. The width of the openings must be held to close tolerances. A simple outline template controls the movements of the machine, while the angular position of the opening is produced by the fixture holding the work at the correct angle with the cutter spindle. The total time for machining these six openings, including set-up time, is three and one-half hours. Previous performance was two and one-half days.



PRATT & WHITNEY

DIVISION NILES-BEMENT-POND COMPANY

Hartford, Conn., U. S. A.

time for plants to resume operations by Monday or Tuesday in preparation for 1940 production. Terms of the plan to end the strike were published Saturday after approval by strike committees, and while the rank and file examined and voted on what President R. J. Thomas described as "a splendid victory" and "substantial gains."

The "gains" included:

- 1) No mention of the demand for a union label on tools, dies, jigs and fixtures;
 - 2) A memorandum of settlement, but not a supplementary agreement for the craftsmen, as had been asked;
 - 3) The UAW-CIO agreed *not* to permit any strike or interference with production until grievance procedure under the existing contract is exhausted;
 - 4) The UAW-CIO agreed *not* to demand concessions requiring changes in the present contract until ownership of the contract (CIO or AFL) is settled.
- Real gains included the granting of sole bargaining rights in the 42 plants where the CIO controls the bargaining

committees. In addition there were wage increases of 5c. per hr. to many skilled workers, but with a "freezing" clause which is an agreement on the part of the union to refrain from seeking changes in the provisions relating to wage and job classifications and wage differentials in the present settlement until after March 1, 1940.

Wages are to be settled in each plant on the basis of a model agreement drawn up for Fisher Plant No. 23 (the main Fisher die shop). In some cases, plants designated the "group one" shops, wages will be at least equal to No. 23 rates. In "group two" plants, wages will be not more than 5c. below the corresponding rates in No. 23.

Among the rates in No. 23 are: Die makers, \$1.30 maximum-\$1.15 minimum (formerly \$1.25-\$1.10); tool makers, \$1.25 to \$1.10 (formerly \$1.20-\$1.05); lathe and grinder operators, planers and slotters, and mill operators (vertical and horizontal), all \$1.20 to \$1.05, unchanged; drill grinders, \$1.10 to 95c. (formerly \$1.05-90c.). Maintenance rates, machine repair and welders' rates are unchanged at \$1.20- to \$1.05; electricians, un-

changed at \$1.15 to \$1.00, while millwrights and pipe fitters were raised from \$1.05-90c. to \$1.10-95c.

Advance Notes on New Models

A few words about the new models which will shortly make their appearance:

CHRYSLER—The rear window panes will be curved for better styling and to reduce glare from lights behind; a distinct innovation, and one that has long been the dream of the stylists and designers. Once believed to be so far-fetched and extreme that the conception of this type of streamlined window was classified as a "designers' nightmare."

FORD-MERCURY — The entire Ford line will be "stepped up" this year, as it was last year. Looks like that will be an annual custom. It's like when little brother grows up to fit big brother's coat, and probably his pants. This is a long way from the idea of inheriting cast-offs, however. This way, the little fellow (buyer of the standard Ford) gets the deluxe-that-was, and most of the accessories that went with it the year before. And the deluxe purchaser will find that his car is much like last year's Mercury, which in turn will inherit most of the selling points of the car that has sold as the Zephyr.

Incidentally, the Mercury will be built this year in the Lincoln-Zephyr plant, probably up on the fourth floor, after one year at the Rouge plant. Maybe there will be more than a resemblance to the present Zephyr, after all!

LINCOLN-ZEPHYR—Will be entirely new. A massive car is being planned for 1940—with much "overhang" in the rear, and a lot more in front. Will be very, very streamlined, and probably will find the BUICK 50 and 70 "Torpedo" cars in the same class. The Zephyr coupe will be an astounding creation, seating six; three in front, three in the rear seat. The first one has just been made by hand at the Briggs Meldrum Avenue plant.

Next year, by the way, Briggs will make only the Zephyr sedan body, and possibly the coupe. The rest will be made in the new Ford body plant at the Rouge.

The Zephyr body will be entirely new, and the coupe, it is known, will incorporate one of the longest welds on any auto body, from the rear quarter window to the tail end.

The entire Ford line is expected to have steering-wheel gearshift levers.

NASH really is working on a new light car, something to fit into a class

THE BULL OF THE WOODS

BY J. R. WILLIAMS





GEORGE SMITH of the research engineering staff, Studebaker Corp., is acting as liaison man between the engineering department and Studebaker distributors in South America. Smith departed a week ago for three months' special service in South and Central American countries to acquaint distributors with Studebaker's modern service policies and practices.

somewhere between the Willys and the Studebaker Champion, it is understood. A prominent engineer, formerly with Graham and Willys, is on the job at the Nash plant getting the design ready.

Production Trend Upward Soon

Within a week of absolute bottom, the automobile industry dropped production to 28,250 cars and trucks last week, according to Ward's Automotive Reports. The previous week, the total was 40,595, and in the corresponding week last year volume was 14,771. After the current week the trend should be sharply upward.

The drop was occasioned by the windup of Chevrolet production of 1939 models. The plants turned out only 2500 Chevrolets in the week, compared with 14,000 the previous week. This brought GM output down from 15,030 to 3530. Ford held to high ground, producing 17,500 Fords and Mercurys, but no Zephyrs. Plymouth produced none, and the Chrysler total slipped from 2540 to 2130.

The Clarence L. Boyd Co., with headquarters West Pottawatomie, Oklahoma City, has been at Guthrie, Okla., and a branch office at 17-19 appointed distributor for the state of Oklahoma by Bucyrus-Erie Co., South Milwaukee, Wis., for Bucyrus-Erie shovels, draglines, clamshells, and lifting cranes in sizes up to and including 2 yd. machines.



CIMATool

Chamfering, Burring and Milling Machines

Cimatool Chamfering Machines handle practically any type of gear (spur, helical, hypoid, spline or internal) in sizes up to 25" in diameter. They chamfer, recess or mill automatically any specified number and grouping of gear teeth as well as special parts or shapes. They produce profiles of a wide variety of forms ranging from the regular wedge to a combination of circular arcs. They do this rapidly and economically.

Machines are available in a variety of sizes and types and equipped for automatic or semi-automatic control. Production rates up to 600 teeth per minute.

Outstanding advantages:

1. High quality finish—wide variety of chamfer shapes.
2. Indexing and feed motions combined in one precision work head.
3. Simplicity—fewest moving parts.
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THIS WEEK IN WASHINGTON

... Court ruling continues injunction against minimum steel wages ... Congress leaves Roosevelt recovery plans in ruins ... NLRB, steel inquiries scheduled during legislative recess ... ICC begins study of rail-water rates.

By L. W. MOFFETT
The Iron Age

WASHINGTON—Seven small independent steel mills in the East, which last March obtained a temporary injunction restraining Secretary of Labor Frances Perkins from enforcing her minimum wage order against the steel industry, late last week won another victory when the District of Columbia Court of Appeals remanded the case to the Federal District Court.

The action represented a setback not only to the Labor Department but also to the CIO's Steel Workers Organizing Committee which had made no secret of the fact that it was relying heavily on the department's steel wage order as an organizing weapon against Bethlehem Steel Co.

Justices Miller and Vinson expressed the opinion that the complaint states a valid cause of action entitling the plaintiffs to an injunction and that the District Court was in error in dismissing the complaint. Counsel for the seven companies had argued that the Secretary of Labor exceeded her authority under the Walsh-Healey Public Contracts Act because the 62½c. minimum rate prescribed was not in fact the prevailing rate in Eastern mills; that she erred in interpreting the term "locality," and that her action was "capricious and arbitrary," detrimental to small companies, causing them irreparable damage.

Injunction Continued

The effect of the court's order will be to continue the temporary injunction granted last March so that, pending further proceedings in the lower court, all steel companies can continue to bid on Government work and receive contracts without complying with the minimum wage order. The steel wage order divides the country into six geographical divisions and pre-

scribes minimum rates ranging from 62½c. in the East and in four Middle Western States, down to 45c. in the South. The opinion itself was not handed down last week but the court said a judgment would be entered shortly, directing the lower court to proceed in accordance with the opinion. Justice Edgerton, who last March dissented when the court ordered a temporary restraining order, will hand down a dissenting opinion.

A little over a year ago steel companies were notified that the Labor Department's Public Contracts Board planned to fix minimum wage rates in the industry under the Walsh-Healey Act. Public hearings were held and the board subsequently recommended that companies doing business with the Government pay a minimum wage of 62½c. per hr., or 45c. by those located in 12 Southern states. A minority opinion, handed down by Board Member O. R. Strackbein and kept under cover for a time, recommended five wage areas, one of which was that

section lying east of a line drawn through Altoona, Pa., where 56½c. would apply.

Recommendations Modified

Even the majority recommendations were ultimately modified by Assistant Secretary of Labor Charles V. McLaughlin, who prescribed four minimum hourly wage rates ranging from 45c. to 62½c., but he declined to permit the differential recommended by Mr. Strackbein for the Eastern mills. Disregarding strong objections from Eastern producers, the Labor Department ordered these rates to become effective on Jan. 31, 1939, but after a score of companies continued to protest against the action the effective date was postponed to March 1. Although a further delay was asked by a number of mills, by the time the effective date arrived the Federal District Court had issued the temporary restraining order for the benefit of three independent companies which had planned to bid on Government contracts coming up at that time. After the lower court dismissed the case, the companies appealed to the higher court where the petition for a further injunction was approved in March. The restraining order has continued in effect since that time.

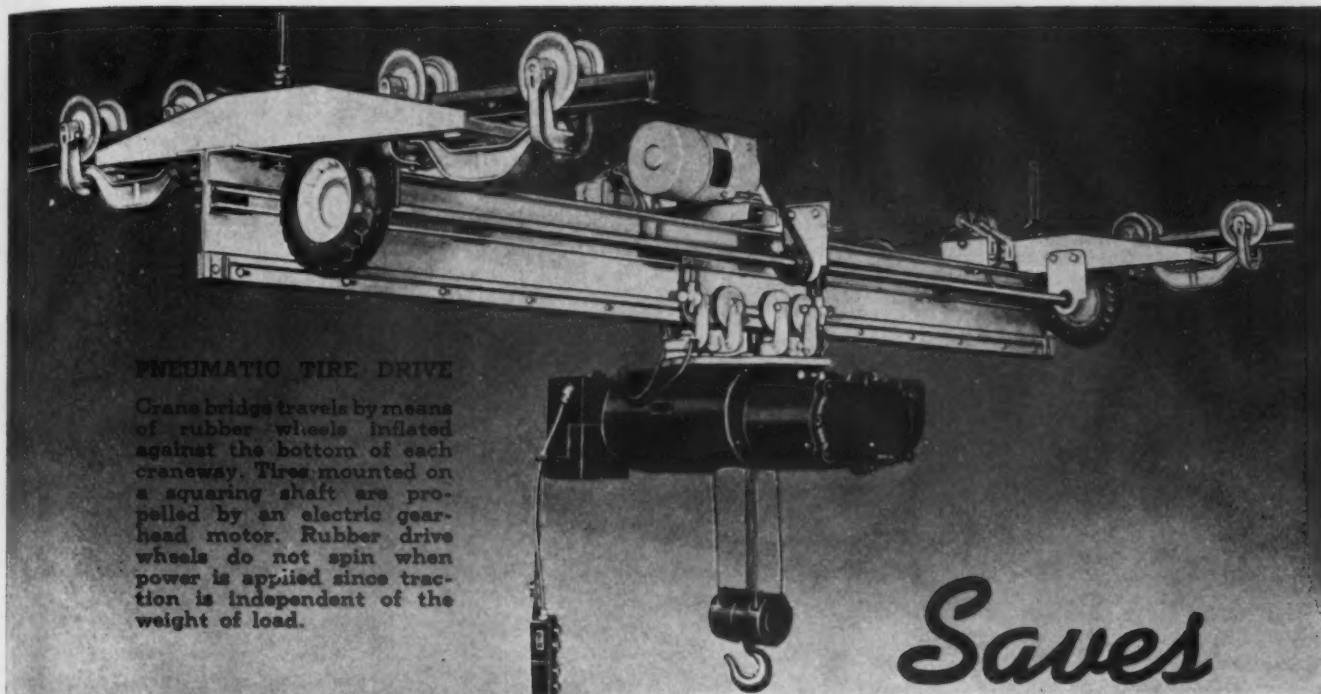
The seven steel companies which joined in the action were the Lukens Steel Co., Coatesville; the Alan Wood Steel Co., Conshohocken; the Central Iron & Steel Co., Harrisburg; the South Chester Tube Co., Chester; the Harrisburg Steel Corp., all in Pennsylvania; the Eastern Rolling Mill Co., Colgate, Md., and the Atlantic Wire Co., Branford, Conn.

NLRB Orders Vote for Rail Workers in Steel Mills

WASHINGTON—The National Labor Relations Board, facing further difficulty because of the controversy raging over the craft vs. industrial union principle, last week ordered that certain railroad employees at the Sloss Sheffield Steel & Iron Co. be allowed to vote in a collective bargaining election for the Brotherhood of Railroad Trainmen, for the United Mine Workers Union or for neither. Board Member Edwin S. Smith said

that he would "not give the railroad employees an opportunity to set themselves apart in bargaining units separate from the industrial unit in which the employees have been represented since 1933."

A similar collective bargaining election has been called by the NLRB at the Great Lakes Steel Corp., Ecorse, Mich., where railroad workers will be given a chance to vote for railroad union representation, for the Independent Steel Workers Association or for neither. Mr. Smith also dissented in this decision.



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Crane bridge travels by means of rubber wheels inflated against the bottom of each craneway. Tires mounted on a squaring shaft are propelled by an electric gear-head motor. Rubber drive wheels do not spin when power is applied since traction is independent of the weight of load.

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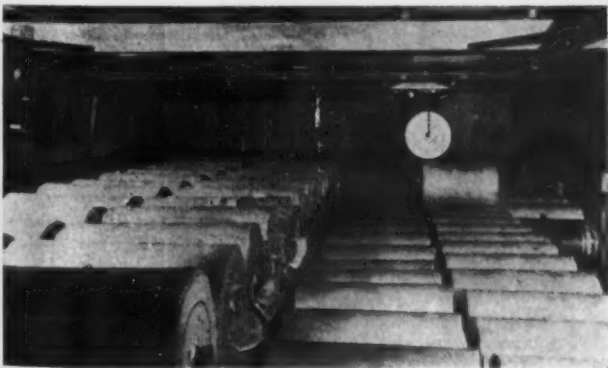
Cranes equipped with the American MonoTractor drive start immediately because traction is independent of the load. They move at variable speeds with lowest possible power cost. Horizontal or vertical movement can be controlled from floor or cab.

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Congress Leaves Roosevelt's Recovery Program in Ruins

WASHINGTON—Members of the New Deal's most hostile Congress were heading for the hinterlands in droves this week, leaving behind in the legislative graveyard the Administration's most cherished recovery measure—the President's proposed \$3,060,000,000 self-liquidating, spending-lending program and the \$800,000,000 proposal for increasing the United States Housing Authority's borrowing power. The House last week dashed all hopes for passage of either measure by refusing even to consider the bills.

The Democratic fighting machine, so recently well oiled with pap and patronage, appeared to have lost most of its one-time punch and vigor. Badly split and limping, it seemed to be heading for an uncertain future as the national swing appeared to be in the direction of conservatism in general. Indicative of the trend in the House was the drastic, unexpected paring of the final deficiency bill, a catch-all measure to make up for budget estimates which went awry, from a recommended figure of \$215,891,168 to \$53,190,056. The Senate, however, later restored a \$191,000,000 provision for continuing the farm loan program on surplus commodities.

A Presidential Warning

President Roosevelt's reaction to the failure of his spend-lend bill, probably one of the worst defeats of his New Deal Administration, was that the House had a perfect right to jettison the measure but that individual members would have to answer for their actions to constituents. It was his view that taxpayers would suffer because of continued high relief expenditures and that factories would feel the effects in 60 to 90 days because of the lack of orders which he said would have resulted from the program. He accepted the estimate of Senate Majority Leader Barkley that 500,000 new jobs would have been created and estimated that for every one of these, three additional men would have been put to work "behind the lines."

By the White House yardstick, it was the second time in less than three weeks that Congress had passed up an opportunity for creating a little business boom. The first occasion came when the Senate Foreign Relations Committee turned thumbs down on neutrality legislation desired by the

President. Although reaction on the stock market ran counter to his contention and business circles had difficulty following his argument, Mr. Roosevelt at that time said that Congressional failure to pass neutrality legislation would retard business.

Business Upswing Foreseen

Even as the House was killing the bill to broaden the USHA slum-clearance powers to include urban benefits, Acting Secretary of the Treasury John W. Hanes told a House Ways and Means sub-committee that the country was on the threshold of a real forward move in business. The spokesman for the Treasury Department, where the rate of turn-over among key officials has been rather high in recent years, attributed the expected business upturn to increasing forward orders, a sound condition of inventories and numerous individual instances of improvement. Reconciling this optimistic view with other forecasts from high sources was difficult for many observers.

Unpredictable, impervious to worry and outwardly unperturbed by the defeat of the spend-lend bill, Mr. Roosevelt indicated that no action could be taken on any phase of the program even with existing authority vested in the RFC and other Governmental lending and spending agencies. He said he had no further plans on the subject. But despite the sharp rebuff on the spending-lending formula, he passed the word along to his Congressional lieutenants to call up for consideration the USHA measure.

White House insistence that a record be made on a bill which faced certain defeat prompted reports that Mr. Roosevelt intended to make housing and lending bill votes an issue, together with the neutrality setback, when he takes a swing through the West in October. By that time taxpayers will be well acquainted with the names of their representatives in Congress who voted "no" and the President could put the issue squarely before the people. Mr. Roosevelt has denied that he has any such intentions but there already are rumors of a special session later in the year and many observers believe that there is an even chance that there will be an extra session call.

Hatch Bill Signed

While many Congressional foes were unceremoniously knifing Admin-

istration measures distasteful to them, a few gave the President a verbal pat on the back when he signed the Hatch bill, which regulates political activity by WPA workers and rank-and-file Federal employees. Planned by several conservative Democrats in the Senate who were fearful that their chances for pushing the candidacy of an anti-New Dealer would be futile if the political activities of job-holders in the New Deal's vast political machine were not curbed, the measure was approved by the President after he had praised its objectives and condemned its vagueness and after he had conferred at length with Attorney General Murphy, whose official opinion on the bill is understood to have been the basis of the President's interpretation and signature. Many had believed that the measure would receive a veto.

It was Vice-President Garner who probably had more to do in pushing the Hatch bill toward enactment than most people give him credit for; in fact, the personal attack made on the Vice-President two weeks ago by CIO Chairman John L. Lewis is taken to mean that Mr. Garner has been "marked" by the CIO as an enemy of labor and as one who is to be reckoned with as a major power in Congress and in the political orbit.

CIO Meets Setbacks

But whatever part was played by the Vice-President and other conservative Democrats in throwing cold water on labor's attempts to dictate Congressional policy, organized labor has accomplished less in the last Congress than it has during the past six years. Efforts of the CIO went a long way toward blocking amendments to the Wagner Act, but it was unable to stem the tide in the House when that body voted for an exhaustive investigation of NLRB activities and the board's administration of the Wagner Act.

A move to broaden the Walsh-Healey Public Contracts Act, under which more sub-contractors would be brought under the law, the contract limit lowered to \$4,000 and violators of the Wagner Act denied Government contracts, turned out to be unsuccessful despite labor's interest in such amendments ever since the law was first put on the statute books.

Labor also was pushing hard for enactment of the USHA bill and tried desperately to get Congress to restore prevailing wage rates on relief projects and to prevent other relief pay cuts. Labor also protested against the unemployment relief appropriation cut to \$1,755,600,000, which was \$784,000,000 less than last year, but Con-

gress went ahead and wrote its own ticket for a change.

LaFollette Bill Left

Although the bill to which it was attached was subsequently defeated, a proposal by Senator Tydings, Democrat of Maryland, to restrict political contributions of labor unions was a direct slap at the CIO chieftain and the CIO contributions to the New Deal in 1938.

Both factions of organized labor, especially the CIO, had been pushing for enactment of the LaFollette oppressive labor practices bill which had been reported favorably by the Senate Education and Labor Committee. When the final gavel fell in the Senate, the bill remained behind unacted upon together with hundreds of other unsuccessful bills.

Japanese Shipbuilding At New High Level

WASHINGTON — Sharply increased activity in Japanese shipyards in recent months is indicated in a report to the Transportation Division of the Department of Commerce. The number of merchant vessels registered at the end of March, 1939 reached a new high of 1099, aggregating 4,742,422 gross tons, an increase of 20 vessels and 101,645 tons in four months, or an increase of 170 vessels and 872,548 tons since its China campaign started in July, 1937. The major portion of the increased merchant tonnage represents new construction since purchases of foreign tonnage were strictly limited during the past year, the Department said.

NLRB Orders Elections At Two Plants

WASHINGTON—A secret ballot election has been called by the National Labor Relations Board at the La Plant-Choate Mfg. Co., Inc., Cedar Rapids, Iowa, to permit production, maintenance and service employees to vote for AFL's machinists union, the CIO's farm equipment workers union, or for neither.

The board also has called the fourth election for workers at the Alcoa works of the Aluminum Co., of America, in Tennessee. Employees will vote for or against the CIO's aluminum workers union. The last election, held on June 22, brought the CIO union the greatest number of votes but it did not receive a majority of the ballots.

Government Steel Orders Total \$645,733

WASHINGTON — Government contracts for iron and steel products, as reported by the Public Contracts Division, Labor Department, for the week ended July 29, totaled \$645,733. For the same period, the division reported contracts aggregating \$678,833 for non-ferrous metals and alloys, and \$902,065 for machinery. Details follow:

Iron and Steel Products	
Philadelphia Gear Works, Philadelphia, Navy, S & A, circles, training	\$38,000.00
National Tube Co., Pittsburgh, War, Ordnance, forgings, steel	105,139.60
Clemson Bros., Inc., Washington, D. C., and Middletown, N. Y., Navy, S & A, blades, hacksaw ..	22,367.93
Wm. Scrimgeour-Royal Silver Mfg. Co., Norfolk, Va., Navy, S & A, tableware, steel	44,037.28
Firecraft Door Co., Chicago, T.V.A., doors, frames, hardware	17,775.00
Thompson Mfg. Co., Denver, Interior, steel outlet pipes	11,795.00
Thompson Mfg. Co., Denver, Interior, penstocks	30,228.50
Timken Roller Bearing Co., Steel & Tube Division, Canton, Ohio, Navy, S & A, tubing, steel	28,925.45
Republic Steel Corp., Massillon, Ohio, War, Ordnance, steel bar stock	27,072.50
Carpenter Steel Co., Reading, Pa., War, Ordnance, steel rods	10,800.00
Nashville Bridge Co., Nashville, Tenn., T.V.A., structural steel building	13,190.00
Blaw-Knox Co., Pittsburgh, T.V.A., steel towers	158,095.98
Anaconda Wire & Cable Co., New York City, Pearl Harbor Navy Yard, cable	13,510.85
Sheffield Steel Corp., Kansas City, Mo., War Engineer, galvanized wire	24,399.55
Soule Steel Co., San Francisco, Farm Security, steel shelters ..	62,925.85
Butler Mfg. Co., Kansas City, Mo., Farm, Security, steel shelters ..	36,966.75
Non-Ferrous Metals and Alloys	
Kirk & Blum Mfg. Co., Cincinnati, T.V.A., aluminum housing ..	\$13,339.00
Aluminum Co. of America, Pittsburgh, T.V.A., electrical conductor	99,168.72
Aluminum Goods Mfg. Co., Manitowoc, Wis., Navy, S & A, pans and pitchers	10,240.00
Aluminum Co. of America, Pittsburgh, Pa., War, Ordnance, aluminum strips, bars and sheets ..	15,575.71
Chase Brass & Copper Co., Inc., Waterbury, Conn., War, Ordnance, clip brass	13,060.00
Hartford Machine Screw Co., Hartford, Conn., War, Ordnance, percussion primer	17,703.75
Whipple & Choate Co., Bridgeport, Conn., Newport Navy Yard, bronze	26,928.00
Riverside Metal Co., Riverside, N. J., Treasury, bronze blanks	38,250.00
Phelps Dodge Copper Products Corp., British American Tube Division, New York City, Navy, S & A, tubes, condenser	116,039.09
Flemm Lead Co., Inc., Long Island City, N. Y., Navy, S & A, lead, pig	35,132.50
Scovill Mfg. Co., Philadelphia, Treasury, blanks for U. S. 5c. pieces	51,500.00
American Brass Co., Waterbury, Conn., Navy, S & A, tubing, copper nickel alloy	129,969.44
Bart Laboratories, Belleville, N. J., War, Engineer, searchlight molds and mirrors	96,600.00
International Nickel Co., Inc., New York City, Huntington, W. Va., Newport Navy Yard, nickel copper alloy	15,327.18
Machinery	
Commercial Engineering Co., Washington, D. C., Navy, S & A, sets, compressor	\$35,547.96

Hamilton Tractor & Equip. Co., Chattanooga, Tenn., T.V.A., tractors	95,420.43
Hercules Motors Corp., Canton, Ohio, War, QMC, repair parts, engines	Indefinite
Caterpillar Tractor Co., Peoria, Ill., War, Engineer, tractors	14,212.00
Wm. Sellers & Co., Inc., Philadelphia, Navy, S & A, machines ..	323,600.00
Brown & Sharpe Mfg. Co., Providence, R. I., War, Ordnance, milling machines	11,025.92
Gisholt Machine Co., Madison, Wis., Navy, S & A, lathe, turret	13,575.00
Springfield Machine Tool Co., Springfield, Ohio, Navy, S & A, lathes, engine	12,369.00
Warner & Swasey Co., Cleveland, Navy, S & A, lathes, turret ...	11,252.90
Acme Machine Tool Co., Cincinnati, Navy, S & A, lathes, turret ..	12,165.70
American Tool Works Co., Cincinnati, Navy, S & A, lathe, engine ..	15,712.00
Swind Machinery Co., Philadelphia, War, Ordnance, boring mill ...	14,634.00
Miehle Printing Press & Mfg. Co., Chicago, Navy, Marine, printing press	13,710.00
American Type Founders Sales Corp., New York City, Navy Purchasing Officer, printing presses	17,759.38
Bucyrus-Erie Co., S. Milwaukee, Wis., War, Engineer, pump casings	26,800.00
Harnischfeger Corp., Milwaukee, Interior, traveling crane	12,570.00
M. L. Bayard & Co., Inc., Philadelphia, Navy, S & A, machinery, hoisting	180,170.00
Schutte & Koerting Co., Philadelphia, Navy Purchasing Officer, units, drain collecting	14,036.70
Singer Sewing Machine Co., New York City, War, C.W.S., machines, sewing	13,234.20
E. W. Bacharach & Co., Kansas City, Mo., WPA, carbon dioxide generating equipment	14,270.00

SWOC To Celebrate "Phil Murray Day"

STEEL workers who are members of the SWOC union on Saturday, Aug. 12, will observe Phil Murray Day, an annual holiday on which the SWOC chairman will be honored for his campaign to build up the union.

Without mentioning John L. Lewis, head of the CIO, the SWOC announcement of the new holiday describes Murray as a man who speaks quietly and earnestly, convincing rather than overwhelming his audience, and labels the campaign to unionize the steel industry as the "most intelligent in the history of labor."

Mr. Murray's decision to work for labor organizations was made when, as a young employee in a western Pennsylvania mine, he was seized by deputy sheriffs during a strike and turned loose in Pittsburgh with the suggestion that he not return.

"I've never had a doubt in my mind since then of what I wanted to do with my life," Murray said.

The SWOC reports that it has won signed contracts with 595 steel manufacturing, fabricating and processing firms under Murray's leadership. Peaceful administration of union contracts in steel, the union says, has "won the commendation of management and the public."

July Pig Iron Output Up 7.6 Per Cent

PRODUCTION of coke pig iron in July totaled 2,356,270 gross tons, compared with 2,118,451 tons in June.

On a daily basis July production showed a gain of 7.6 per cent over that in June, from 70,615 tons a day to 76,009 tons in July, which was the highest since March this year, when daily production averaged 77,246 tons a day. The rate of operation last month was at 55.8 per cent of the industry's capacity, as compared with 51.7 per cent in June.

There were 129 furnaces in blast on Aug. 1 (revised), operating at the rate of 79,450 tons a day, compared with 118 furnaces on July 1, producing at the rate of 72,495 tons daily. Thirteen furnaces were put in operation and two were blown out or banked. The United States Steel Corp. put five in operation. Independent producers put seven in operation and took two off blast and merchant producers blew in one furnace.

Furnaces blown in included: One Duquesne, Carnegie-Illinois Steel Corp.; one Monongahela and two Lorain, National Tube Co.; one Ensley, Tennessee Coal, Iron & Railroad Co.; one Lackawanna, Bethlehem Steel Co.; Mary, Sharon Steel Corp.; Shenango, of the Shenango Furnace Co.; two River furnaces and Betty, Republic Steel Corp.; one Madeline, Inland Steel Co. and one Colorado, Colorado Fuel & Iron Corp.

Furnaces blown out or banked were one Bethlehem furnace of Bethlehem Steel Co., and No. 1 Hamilton furnace of American Rolling Mill Co., which was taken out of blast for relining.

Production of Coke Pig Iron and Ferromanganese

	Gross Tons Pig Iron*		Ferromanganese	
	1939	1938	1939	1938
January	2,175,423	1,429,085	20,805	22,288
February	2,060,187	1,298,268	18,655	20,205
March	2,394,615	1,452,487	16,008	21,194
April	2,056,177	1,376,141	11,518	18,697
May	1,717,516	1,255,024	7,888	13,341
June	2,118,451	1,062,021	16,617	14,546
½ year	12,522,369	7,873,026	91,491	110,281
July	2,356,270	1,201,785	21,213	20,818
August .....	.....	1,493,995	.....	6,088
September .....	.....	1,680,435	.....	630
October .....	.....	2,052,284	.....	3,621
November .....	.....	2,269,983	.....	13,156
December .....	.....	2,210,728	.....	19,197
Year .....	.....	18,782,236	.....	173,791

*These totals do not include charcoal pig iron.
†Included in pig iron figures.

Merchant Iron Made, Daily Rate

	1939	1938	1937	1936	1935
January	10,603	10,635	16,106	10,537	3,926
February	9,637	8,854	16,514	11,296	6,288
March	8,951	8,524	16,457	10,831	7,089
April	8,508	8,273	14,517	13,897	8,799
May	7,038	6,431	19,483	12,814	8,441
June	7,613	5,375	15,870	14,209	7,874
July	8,396	5,495	19,609	11,619	8,644
August .....	.....	6,614	17,331	12,148	8,194
September .....	.....	11,205	20,065	12,526	10,090
October .....	.....	10,799	18,950	13,645	11,199
November .....	.....	13,208	15,662	14,739	12,503
December .....	.....	9,130	10,964	14,852	13,312

Daily Average Production of Coke Pig Iron

	1939	1938	1937	1936	1935
January	70,175	46,100	103,597	65,351	47,656
February	73,578	46,367	107,115	62,886	57,448
March	77,246	46,854	111,596	65,816	57,099
April	68,539	45,871	113,055	80,125	55,449
May	55,404	40,485	114,104	85,432	55,712
June	70,615	35,400	103,584	86,208	51,570
½ year	69,184	43,497	108,876	74,331	54,138
July	76,009	38,767	112,866	83,686	49,041
August .....	.....	48,193	116,317	87,475	56,816
September .....	.....	56,015	113,679	91,010	59,216
October .....	.....	66,203	93,311	96,512	63,320
November .....	.....	75,666	66,891	98,246	68,864
December .....	.....	71,314	48,075	100,485	67,950
Year .....	.....	51,458	100,305	83,658	67,556

Production by Districts and Coke Furnaces in Blast

FURNACES	Production (Gross Tons)		August 1		July 1	
	July (31 Days)	June (30 Days)	Number in Blast	Operating Rate, Tons a Day	Number in Blast	Operating Rate, Tons a Day
New York:						
Buffalo	154,834	142,406	9	5,520	8	4,850
Other New York and Mas- sachusetts	14,711	10,950	1	475	1	365
Pennsylvania:						
Lehigh Valley	48,767	47,332	3	1,260	4	1,580
Spiegeleisen	4,525	4,176	1	145	1	140
Schuylkill Valley	21,773	18,284	2	700	2	610
Susquehanna and Lebanon Valleys	14,003	14,490	1	450	1	485
Pittsburgh District	434,922	406,019	21	14,435	20	13,535
Ferro. and Spiegel	16,649	5,401	2	535	1	180
Shenango Valley	11,511	.....	1	445	0	.....
Western Pennsylvania	49,969	52,758	3	1,610	3	1,760
Ferro. and Spiegel	6,590	6,417	1	215	1	215
Maryland	173,093	151,654	6	5,585	6	5,450
Wheeling District	127,639	107,400	6	4,115	6	4,030
Ohio:						
Mahoning Valley	261,865	226,785	12	8,510	11	8,240
Central and Northern	188,293	169,986	14	8,500	9	5,840
Southern	43,348	46,123	4	1,095	5	1,535
Illinois and Indiana	428,221	395,435	17	14,140	16	12,975
Michigan and Minnesota	75,054	74,900	4	2,420	4	2,495
Colorado, Missouri and Utah	41,742	37,765	3	1,440	2	1,005
The South:						
Virginia .....	.....	.....	0	.....	0	.....
Ferromanganese	2,775	2,799	1	90	1	95
Kentucky	24,854	14,732	2	800	2	680
Alabama	204,691	175,935	14	6,755	13	6,205
Ferro. and Spiegel	6,441	6,704	1	210	1	225
Tennessee .....	.....	.....	0	.....	0	.....
Total	2,356,270	2,118,451	129	79,450	118	72,495

Navy Department Awards Contracts

WASHINGTON—The Bureau of Supplies and Accounts, Navy Department, awarded contracts on Aug. 1 to these companies:

United States Electrical Tool Co., Cincinnati, \$8,338 for electric drills; McKiernan Terry Corp., Harrison, N. J., \$126,860, airplane crane machinery and spare parts; Pittsburgh Steel Co., Pittsburgh, \$9,705, steel tubing and pipe; Storms Drop Forging Co., Springfield, Mass., \$13,955, nickel-copper-alloy forgings. The bureau also awarded a \$15,591 contract to the International Minerals & Metals Corp., New York City, for ingot copper.

On Aug. 3 the bureau made these awards: Jones & Laughlin Steel Corp., angles and shapes, \$51,310; Grumman Aircraft Engineering Corp., Bethpage, L. I., airplanes and spare parts, \$1,786,860; Brown & Sharpe Mfg. Co., Providence, R. I., milling machines \$17,784; Edward G. Budd Mfg. Co., Philadelphia, boiler casings and brick pans, \$78,716.

1935
3,926
6,288
7,089
8,799
8,441
7,874
8,644
8,194
0,090
1,199
2,503
3,312

1935
47,656
57,448
57,098
55,449
55,713
51,570
54,138
49,041
56,816
59,216
63,820
68,864
67,956
67,556

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Distributor of Shakeproof Products Manufactured by Illinois Tool Works
Plants at Chicago and Elgin, Illinois 2525 N. Keeler Ave., Chicago, Ill.
In Canada: Canada Illinois Tools Ltd., Toronto, Ontario
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 Shows above are SENS units with special large internal type lock washers for use in assemblies where both a large flat washer and a lock washer were formerly required.

SPECIAL APPLICATIONS THAT SHOW EXTRA SAVINGS!


 The SENS units illustrated below are equipped with external-internal Shakeproof Lock Washers for applications where a large bearing surface is necessary; External tooth lock on the work surface while the internal tooth lock the screw head.

"Fastening
E P
Headquarters"

SHAKEPROOF

NLRB Orders Vote For 78,000 Employees

WASHINGTON—In a three to two decision, the National Labor Relations Board last week ordered collective bargaining elections for some 78,000 employees of the Chrysler Corp., the Briggs Mfg. Co., and the Briggs Indiana Corp., in an effort aimed at settling the dispute between the AFL and the CIO factions of the United Automobile Workers Union.

Dated July 31, the order directed separate elections to be held within 20 days in each of 11 individual plants and in two plants grouped together of the Chrysler Corp., at Detroit, and that similar elections be held within 15 days among employees of the Motor Products Co., and eight Briggs plants in Michigan and Indiana. Board Member Edwin S. Smith, who dissented, took the view that failure to group all the plants together "makes possible further frustration of collective bargaining."

The NLRB also has called an election for employees of the Coldwell Lawnmower Co., Newburgh, N. Y. They will vote for or against the AFL's machinist's union but will have no chance to vote for the Coldwell Employees' Benevolent Association which, the board holds, is "an employer-dominated union."

After certifying two AFL unions representing pattern makers and electrical workers, the board called an election at the National Can Corp., Maspeth, N. Y., to permit machinists to vote for the AFL's International Association of Machinists or for the CIO's Steel Workers Organizing Committee.

At the same time, the board set aside petitions filed by three AFL craft unions which had sought certification as representatives of 20 employees at the American Can Co., Brooklyn, N. Y. Board Chairman J. Warren Madden dissented, insisting that under the decision craft unions are denied the right to exist in the plant.

A collective bargaining election has been called at the Southwestern Engineering Co., Los Angeles, to allow workers to vote for or against the AFL's boilermakers, shipbuilders, and welders union. The SWOC union had insisted that a plant-wide unit was the appropriate bargaining group but the NLRB decided there was "not a substantial showing" of a desire for representation by the CIO union.

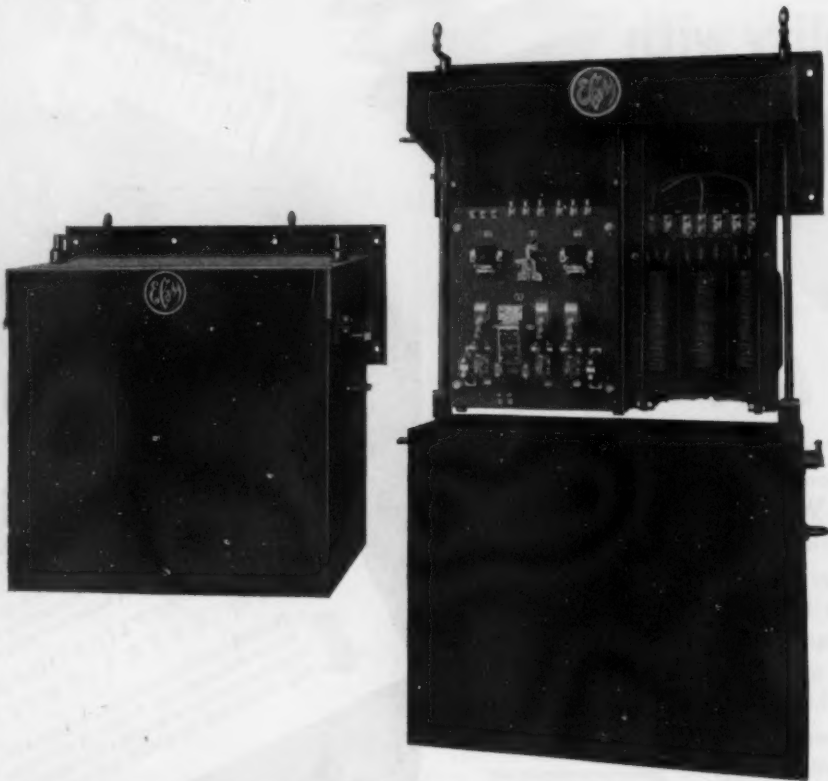
Farm Equipment Imports Off Third from 1938

WASHINGTON — Imports of agricultural machinery during the first six months of 1939 amounted to \$2,017,012, a 33 per cent decline from the total of \$3,003,602 for the same period of 1938.

The Machinery Division of the Department of Commerce reports that the greatest decline was registered by the group containing combines, headers, harvesters, and reapers, which dropped from \$889,854 in the first half of 1938 to \$369,593 in the first six months of 1939.

The only two countries which increased their exports to the United States were Sweden and Finland, the latter showing the most outstanding gain which amounted to 93 per cent. Germany's exports of farm equipment to this country registered the heaviest decline, dropping 81 per cent. The principal suppliers during the first half of 1939, in the order named, were Canada, Sweden, United Kingdom, Finland, and Belgium.

EC&M STARTER for Class 1, Group D Hazardous Locations



THIS illustration shows an EC&M Wall-mounted, Completely Oil-immersed, Primary-reactor Starter for reduced voltage starting of a 50 HP, 440 Volt motor in a Michigan Oil Refinery. The start and stop push button station is an EC&M Bulletin 1105-A Push Button with contacts arranged for oil-immersed or air-break operation. This equipment is designed for use in Hazardous Locations defined by the Underwriter's Laboratories as Class I, Group D.



HEAVY DUTY MOTOR CONTROL
FOR CRANES, MILL DRIVES AND
MACHINERY • BRAKES • LIMIT
STOPS • LIFTING MAGNETS AND
AUTOMATIC WELD TIMERS.

As shown above, this wall-mounted starter has self-contained screw-type mechanism for lowering the oil-tank. Overload relays as well as the magnetic contactors for handling the main motor circuit are completely oil-immersed. The tank is equipped with sight oil-gauge.

This attractive unit, well suited for oil refineries, grain elevators, pump houses, etc., is shown in EC&M Booklet No. 88. Write today for a copy for your files.

NLRB, Steel Industry, Tax Structure, All Will Be Investigated

WASHINGTON—Several congressional investigations, the favorite recess activity of both Houses, pointed this week to a busy season ahead despite the adjournment of Congress. In addition to the Temporary National Economic Committee's investigation of the steel industry, which of course was authorized last session when Congress gave the anti-monopoly committee broad powers to inquire into all phases of the economic machine and into all industries, these inquiries will be launched during the Congressional recess:

1. A \$50,000 investigation of the National Labor Relations Board to be undertaken by a special House committee whose job will be to study all phases of labor board activities and to make recommendations for remedial action.

2. A special study by the House Ways and Means Committee aimed at a thorough overhauling of the tax structure. Experience in the past indicates that the chances for Congress approving legislation embodying such changes in an election year are slim.

3. The La Follette Civil Liberties Committee has been given \$50,000 additional to continue an inquiry which already has continued for more than two years. According to the committee's announced plans the bulk of the funds will go for an investigation of the Associated Farmers of California, although some reports have it that new evidence warranting the committee's attention has recently been uncovered. The committee had asked for a \$100,000 appropriation.

4. The Senate Banking and Currency Committee will conduct a \$25,000 inquiry into national monetary policies. To start in October, the investigation is expected by sponsors to embrace every phase of the money problem.

ICC Starts Study Of Rail-Water Rates

WASHINGTON—The Interstate Commerce Commission has launched a general investigation of rail and water class rates and of freight classifications by rail and water in an effort to bring the freight rate structure up to date by prescribing "such rates and classifications as may be found justified."

Class rates—rates applicable to all shipments not moving under commod-

ity rates—will be under scrutiny by the ICC except in mountain-Pacific territory where, it was indicated, the class rate structure has not been a subject of complaint, and on trans-continental traffic. Hence the investigation will cover the intraterritorial and interterritorial class rate structures in Northern, Southern, South-western and Western trunk-line territories.

The present class rate structure has been under criticism for some time, particularly in the South where it is contended that interterritorial rates

are considerably higher than rates in the North and that the rates applying on shipments entirely within the North should also be applicable to shipments moving from south to north.

No dates were fixed for public hearings and no estimates were made as to the time necessary to complete the inquiry but the ICC announcement described the contemplated investigation as "a large undertaking" and one which, it said, can be simplified if current efforts of carriers' and shippers' organizations to revise class rate structures prove successful.



Coal Unloading Tower Designed and Built by Heyl & Patterson.

TOWERS FOR TONNAGE

• It takes less than 60 minutes for the buckets of this giant tower to unload the coal from the 850-ton barge and feed it to the world's largest by-product coke plant. Here is an operation in material handling typical of many engineered by Heyl & Patterson for the heavy industries.

HEYL & PATTERSON

Travelling Bridges
Car Dumpers
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Grab Buckets
Special Cranes
Industrial Cars
Coal and Coke
Handling Plants
Unloading Towers

If your problem is the transfer of bulk materials at river or lake, the stocking or reclaiming of ore, the disposal of refuse, it may pay you to get in touch with this organization—for 50 years designers and builders of practically all types of machinery for handling tonnage materials.

HEYL & PATTERSON INC.

50 WATER STREET

PITTSBURGH, PA.

Outlook Dark for British Tin Plate

WASHINGTON—Despite domestic demand from armament requirements, the export outlook for the British tin plate industry appears extremely pessimistic, according to a report from the Department of Commerce. The confused state of the British tin plate export trade is indicated in the recent announcement of the proposed new tin plate works in

Australia, which will have a capacity of approximately 100,000 tons a year. This is greater than the total Australian demand for sheets and tin plate.

The loss of the market to the Welsh tin plate industry will be a heavy one because in 1938 Australia was the outlet for 85,000 tons of British tin plate, or about 37 per cent of total British exports of that item. During the first half of the current year, shipments abroad of tin plate from Wales amounted to 171,000 tons, which was

approximately the same total recorded for the corresponding period of 1938, the department said.

Richard Thomas & Co. Directors Resign

LONDON—Acute differences of opinion over policy, which may lead to changes in the management, are understood to have arisen among the directors of Richard Thomas & Co., the £21,000,000 South Wales steel and tin plate combine, of which Governor Norman of the Bank of England assumed control in July, 1938. Three of the directors appointed by the committee of control last August have tendered their resignations. These directors are S. R. Beale, chairman and managing director of Guest, Keen & Nettlefolds; Col. Sir W. Charles Wright, chairman of Baldwins; and John E. James, chairman and managing director of the Lancashire Steel Corp.

The fact that the report of the company is more than three weeks overdue has aroused some comment. But at the same time, those who had heard the persistent rumors of the resignation of the new directors were puzzled that the new system of management should have broken down so soon.

The appointment of the three directors who represent enterprises in competition with Richard Thomas followed the formation of the committee of control, and was designed to insure that the vast new Ebbw Vale plant, when completed, should not seriously disorganize the rest of the tin plate industry in Britain. It was, in fact, a move for the rationalization of the industry.

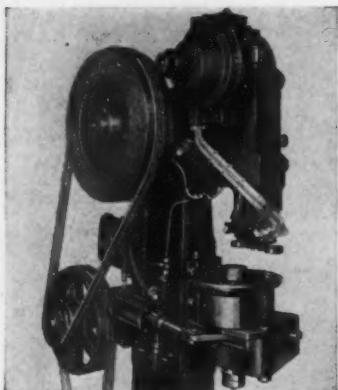
The formation of the control committee was itself a condition of the provision by the banks of the additional £6,000,000 (\$30,000,000) required to complete the Ebbw Vale plant. The committee consists of Governor Norman, for the Bank of England; Sir William Firth, for Richard Thomas & Co.; Viscount Greenwood for the steel industry; and E. H. Lever, of the Prudential Assurance, for the trustees of the existing Debentureholders.

Imports at Philadelphia

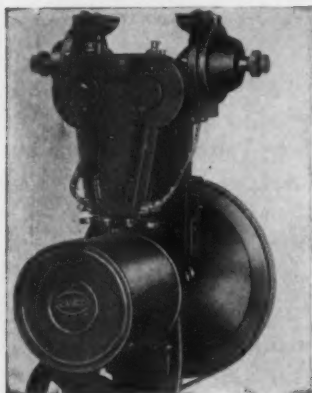
PHILADELPHIA—The following iron and steel imports were received here during the past week: 997 tons of chrome ore from South Africa; 101 tons of sponge iron, 47 tons of steel tubes, 12 tons of wire rods and 32 tons of steel bars from Sweden.

the RIVITOR

enables you to offer a better product at a lower price



The Rivitor is shown here setting two solid rivets at a time to attach cushion springs to driven clutch plate assemblies. The plates are automatically indexed.



This Rivitor sets two rivets at the same time to attach handle brackets to paint pails.

to effect a stronger riveted joint at rates up to 3200 rivets an hour and at a saving by using the less expensive solid rivets.

You'll do your riveting smoothly, you'll do it automatically and with precision. The setting action is actually one of "coining". The motion proceeds from a fast approach to the riveting position to a slower setting action—giving the metal time to flow.

The Rivitor ably handles many jobs in many industries. Submit samples of your riveting jobs. We should like to show you the type of solid rivet joints that can be effected automatically. We should like you to realize the savings that you are always looking for so that you can offer a better product for less.

Send samples to THE TOMKINS-JOHNSON CO.,
628 N. Mechanic St., Jackson, Michigan or get in touch with our representative in your territory:

Boston—General Mach. Corp. . . . Buffalo—R. C. Neal Co., Inc. . . . Chicago—H. F. Wolnick Mach. Co. . . . Cleveland—S. G. Morris . . . Denver—Edward C. Swan . . . Detroit—Haberborn & Wood . . . Grand Rapids—Joseph Monahan . . . Hartford—George M. Pearce, Jr. . . . Indianapolis—Henry G. Hoss . . . Milwaukee—J. M. Grimstad . . . Newark—George M. Pearce . . . Philadelphia—W. A. Rankin (Drexel Hill) . . . Pittsburgh—J. A. Bouslough . . . Rochester—R. C. Neal Co., Inc. . . . San Francisco—R. W. Conroy . . . Syracuse—R. C. Neal Co., Inc. . . . Canada—Geo. T. White Co. (Walkerville, Ont.) . . . Europe—Gaston E. Marbaix, Ltd., London.

South Africa to Control Exports of Scrap

LONDON—Means to conserve South Africa's supplies of iron and steel scrap and to prevent speculation by exporters seeking to exploit the heavy demands set up by the overseas armaments race are to be provided in a bill which the Ministry of Commerce and Industries is sponsoring. The bill empowers the Government to prohibit the export of scrap metal by giving notice in the Government Gazette, provided a scarcity of metal is feared.

South Africa Extending Steel Manufacture

LONDON—Dr. H. J. Van der Bijl, chairman of the South African Iron & Steel Industrial Corp., Pretoria, has been in Britain this summer working on the organization of the new iron, steel and electrical enterprises in the Union. He states that a wing will be added to the steel plant at Pretoria for the manufacture of wire. At present only a little building wire and barbed wire is manufactured at Vereeniging. But the Union consumes about 60,000 tons annually and nearly all is imported.

Dr. Van der Bijl estimates that the South African Iron and Steel Industrial Corporation will be able to produce about one-half the Union's wire requirements—smooth fencing, barbed, jackal-proof fencing, and wire netting. There will be no difference in price at first, but ultimately the corporation will endeavor to establish the price at a lower level. Any attempt from abroad to jeopardize the success of the enterprise by dumping will, it is added, be strongly resisted. The new wire mill will cost approximately £1,500,000 (\$7,500,000).

CAST IRON PIPE

Hollandale, Miss., plans pipe lines for extensions and replacements in water system, totaling about 11,000 lin. ft. Fund of \$37,000 is being arranged for this and other improvements in system.

United States Engineer Office, Custom House, Philadelphia, asks bids until Aug. 17 for 6-in. pipe line system, about 3800 ft. long for water distributing system at Federal property at Chesapeake City, Md., with fire hydrants, meter, etc. (Circular 22).

Rehoboth Beach, Del., plans pipe lines for extensions in water system, including new storage tank, filter machinery and auxiliary equipment. Cost about \$60,000. Special election has been called Aug. 31 to approve bond issue in that amount.

Charlotte, N. C., plans pipe lines for extensions in water system. A bond issue of about \$60,000 is being arranged for this and sewage system. J. B. Marshall is city manager.

Storm Lake, Iowa, asks bids until Aug. 14 for 4000 ft. of 8-in. and 6000 ft. of 6-in. cast iron pipe, and 6000 lin. ft. of 6-in. steel pipe for water system. Walter Throckmorton is water superintendent.

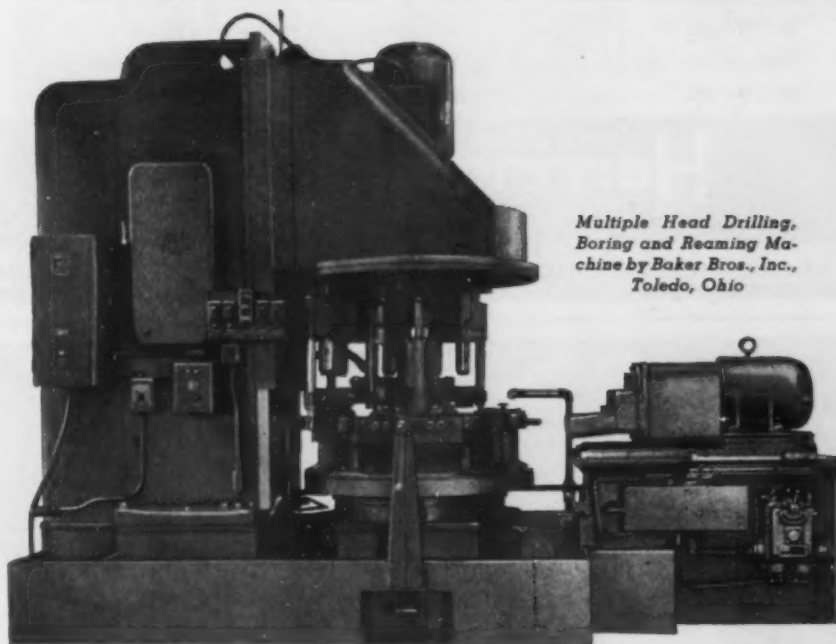
Berryhill Water District, Tulsa, Okla., plans pipe lines for water system and other waterworks installation, including 50,000-gal. elevated steel tank and tower. Cost about \$60,000.

Standardsville, Va., plans about 22,000 lin. ft., various sizes, for water system. Also water storage reservoir of 110,000 gal. capacity and other waterworks installation. Cost about \$68,000 with system installation to be made at same time. Special election has been called Aug. 22 to approve bonds for \$15,000, balance of fund to be secured through Federal aid. James F. MacTier, Church Street, Roanoke, Va., is consulting engineer.

General Purchasing Officer, Panama Canal, Washington, closes bids on Aug. 21 for 1000 lin. ft. of cast iron water pipe; also for quantity of fittings, steel elbows, etc. (Schedule 3547).

Metropolitan Utilities District, 18 and Harney Streets, Omaha, Neb., Col. T. A. Leisen, secretary, plans pipe lines for water system in Districts No. 1584 and 1587, recently created.

LET OILGEAR FEEDS SOLVE THAT STUBBORN PROBLEM



Multiple Head Drilling, Boring and Reaming Machine by Baker Bros., Inc., Toledo, Ohio

The range of Oilgear Fluid Power Feed applications is so broad, the type of machine and machine tool problems they can solve is so varied, that we gladly extend an invitation to every designer with a stubborn power problem on his hands to counsel with our engineers.

Forget the usual limitations on power applications; forget the conventional do's and don'ts, see

what Oilgear Fluid Power Feeds can offer you before you say it can't be done. If it's greater speed, better control, simpler design, stepped-up production, reduced tool breakage, or lower material and tool costs you're after, put it up to Oilgear. Even the tough jobs are often simple the Oilgear way. Write and see. THE OILGEAR COMPANY, 1311 West Bruce Street, Milwaukee, Wis.

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- Perforated metal is for a thousand uses, some of which require precision workmanship to accomplish results otherwise impossible.
- Whatever you require in perforated metal, we are here to produce, either the commonplace, the difficult, or the precision. Your inquiries will have our best attention.

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To get good springs, go where materials, design, production, heat-treating and testing are all under one roof . . . under one control. At Gibson's, you get complete service . . . including deliveries as specified. Let Gibson recommend the spring to use.

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DIVISION OF ASSOCIATED SPRING CORP.

1800 CLYBOURN AVE., CHICAGO, ILL.

SPRINGS • WIREFORMS • SMALL STAMPINGS

18% of Workers Idle Now, 29% Jobless Back In 1933

UNEMPLOYMENT in the United States declined 4.3 per cent in June, according to the National Industrial Conference Board. Since February, the number of jobless has declined 11 per cent, and the total of 9,552,000 in June is the lowest since December, 1937. In June, 1938, the jobless numbered 10,959,000.

In relation to the total working force, which the Conference Board estimates at 54,580,000 in June, 18 out of every hundred available workers were out of jobs. In March, 1933, the trough of the depression, 29 out of every hundred workers were idle. These ratios are in sharp contrast to those of September, 1937, when 11 out of every hundred workers were unemployed, and 1929, when less than 1 per cent of the workers were without jobs.

Use "Gary-Made" Steel, Retail Merchants Urge

CHICAGO—"Buy Products Using Gary-Made Steel" was the slogan adopted for Gary, Ind., by the Gary Retail Merchants Bureau at a meeting last week. R. C. Myers, sales promotion representative, Carnegie-Illinois Steel Corp., Pittsburgh, outlined for the merchants the purposes behind the creation of the "U. S. Steel" label, which is being placed on many consumer products made from corporation steel.

The president of the Gary merchants' organization said that the Gary customer who demands to see the label before making his purchase is acting in his own interests, because "Gary can grow and prosper only as the steel corporation grows and prospers."

Connors Steel Installs Electric Furnace

BIRMINGHAM—Connors Steel Co. has installed an electric furnace to supply its own billets, at a cost of approximately \$100,000. The new furnace, the first of its kind in this district, is expected to greatly increase the range and production capacity of the local plant, turning out carbon and alloy steel billets from which are rolled cotton ties, barrel hoops, strip and light structural shapes. Reinforcing bars, merchant bars, shapes and other products of the company are now furnished either from electric or rail steel.

U. S. Defense Outlay for Year Almost Doubled

WASHINGTON — Appropriations for national defense purposes during the Congressional session just ended totaled close to \$2,000,000,000, as compared with \$1,087,000,000 last year. Although the bulk of the money was appropriated earlier in the session, almost the last Congressional action was the passage of the \$182,000,000 third deficiency bill, which contained a \$10,000,000 item to permit the Procurement Division to purchase strategic and critical materials during the current fiscal year.

The bill also authorized the Navy Department to use \$6,000,000 of its shipbuilding funds to buy armor plate equipment to permit private manufacturers to speed up production of armor. The Navy plans ultimately to lease the equipment if possible, or to scrap it when no longer needed. Also authorized was a third set of locks for the Panama Canal to cost \$277,000,000.

86-Day Strike Is Ended at Milwaukee

MILWAUKEE — The 86-day strike at the Allen-Bradley Co. plant was called off last week by the United Electrical, Radio and Machine Workers, the CIO unit conducting the strike. The union claims to have contracts signed by the strikers by which they agree to remain in good standing with the union for two years or give up their jobs with Allen-Bradley. If the men do not live up to the agreements, breach of contract suits can be brought against them, union attorneys declare.

Consolidated Steel First Half Earnings \$62,071

CONSOLIDATED STEEL CORP. for the six months ended June 30, 1939, earned a net profit of \$62,071, equal to 44c. per share of preferred stock, compared with a profit of \$75,145, or 53c. a share, in the first half of last year.

Gear Makers Plan Fall Meeting

THE 22nd semi-annual meeting of the American Gear Manufacturers Association will be held at Whitcomb Sulphur Springs, St. Joseph, Mich., Oct. 16-18. Charles F. Goedke, president, Ganschow Gear Co., Chicago, is president of the association, and J. C. McQuiston, Wilksburg, Pa., is manager-secretary.



A Minster DOUBLE CRANK STRAIGHT SIDE PRESS

having 160 tons capacity, 8" stroke, 12" slide adjustment and equipped with pneumatic bed cushions. A universal production press that profitably handles short runs. Operators prefer Minster Presses because they are easy and safe to operate.

Write for the new 50 Series Bulletin today

"There Is a Minster for Your Work"

THE MINSTER MACHINE CO., Minster, Ohio

DISC TYPE VALVES— ground and lapped for a perfect seal

The simple leakproof design of Hannifin Air Control Valves has the bronze disc ground and lapped to form a perfect seal with the seat, which is similarly finished. There is no packing, avoiding leakage and packing maintenance troubles. Positive, accurate control of air operated equipment is assured.

Made in 3-way and 4-way types, hand and foot operated, manifold, spring return, electric and special models. Write for Valve Bulletin 34-A.



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ENGINEERS • DESIGNERS • MANUFACTURERS • Pneumatic and Hydraulic Production Tool Equipment

HANNIFIN "Packless" VALVES
AIR CONTROL

A. C. GELDNER, assistant sales manager at Los Angeles for the Republic Steel Corp., has been appointed district sales manager. He joined the Union Drawn Steel Co. as salesman in its Cleveland office in 1920, continuing in that capacity until 1928, when he was made Cleveland district sales manager. In 1932 he joined the staff at the Los Angeles office, and in 1934 was made district sales manager for the Pacific Coast, which position he held until early 1939, when he was ap-

pointed assistant district sales manager at Los Angeles.

♦ ♦ ♦

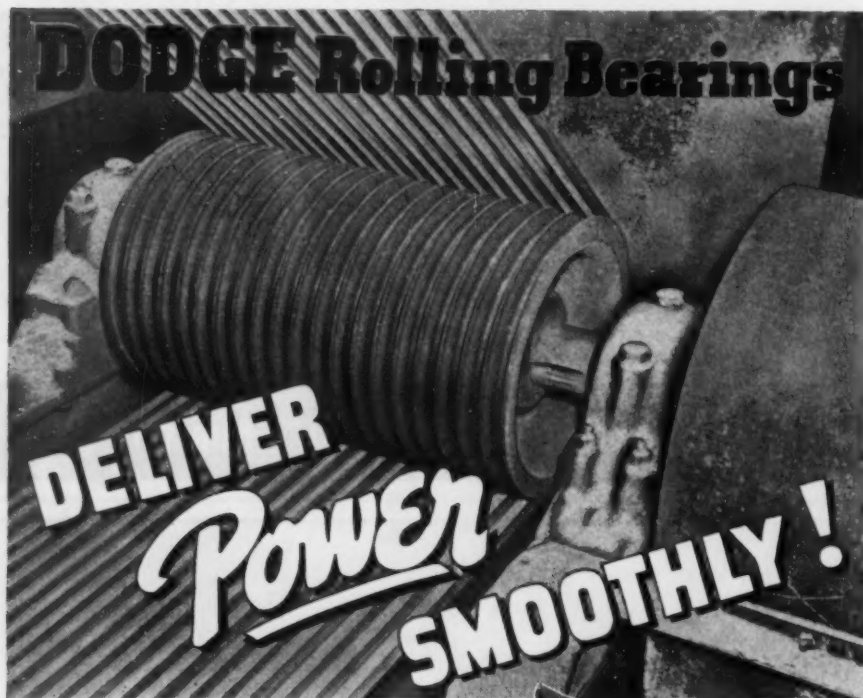
R. L. WILLIAMS, former executive vice-president of the Chicago & Eastern Illinois Railway, has been appointed chief executive officer of the Chicago & North Western Railway. Mr. Williams started in railroading as a messenger boy at the Baltimore & Ohio station, Salem, Ill., at the age of 15. In 1907 he became a telegraph operator for the C. & E. I., eventually

becoming executive vice-president in charge of all departments.

GEORGE H. SMITH has been named assistant to the president of the Chicago & Eastern Illinois Railway. Mr. Smith, whose first railroad experience was gained with the Burlington in 1910, transferred to the C. & E. I., six months later as a stenographer. In 1916 he was made traveling accountant, and in 1938 was promoted to assistant comptroller.

♦ ♦ ♦

WILLIAM C. VAN CLEAF, associated with Allis-Chalmers Mfg. Co., West Allis, Wis., since 1912, has been appointed director of industrial relations



DDODGE-TIMKEN Bearings and V-belt Drives . . . regardless of varying and unusual operating conditions . . . deliver power dependably, smoothly, and economically to the production machines. Such performance bears out the soundness of their design and proves their rugged construction . . . More than 1800 types and sizes of Dodge Bearings are available for both built-in machine application and for power transmission lines . . . For excessive dust and water conditions, Type "C" bearings . . . triple steel sealed . . . are completely assembled, factory adjusted, pre-lubricated units . . . delivered ready to install. Dodge Rolling Bearings and Dodge drives will insure steady, low cost power transmission. Specify Dodge.

DODGE MANUFACTURING CORPORATION
Mishawaka, Indiana, U.S.A.



MORRIS E. LOWDER, whose appointment as general manager of sales of Superior Steel Corp. was announced in these columns on July 27.

of the manufacturing departments at the company's main works. His duties consist of handling all matters pertaining to labor relations, and in this capacity will act as chairman of the company's labor advisory board.

Mr. Van Cleaf entered the company's employ as an electrical apprentice, worked in different capacities on the electrical test floor, and advanced himself to assistant foreman and electrical apprentice supervisor. In 1923 he was made general apprentice supervisor and in 1929 became employment

ONALS . . .

manager, later advancing to manager of the company's personnel work.

♦ ♦ ♦

WALTER A. HAMILTON, a pioneer airline official and aviation executive, has been named by Maj. CARL A. COVER, vice-president and general manager of the Douglas Aircraft Co., to assume duties as manager of the El Segundo division of the company. Mr. Hamilton recently resigned from Transcontinental & Western Air, Inc. He will replace EDMOND R. DOAK at the El Segundo plant, following Mr. Doak's resignation from a Douglas vice-presidency to enter private business, reportedly aircraft parts manu-



A. C. GELDNER, new Los Angeles district sales manager for Republic Steel Corp.

facture. At the same time, ERIC SPRINGER, pioneer Douglas test pilot and assistant superintendent of the Douglas Santa Monica plant, was transferred to El Segundo as assistant manager there. HARRY WILLIAMS, night superintendent of the Santa Monica plant, will become superintendent of the El Segundo division, replacing WOODSON C. DEEDS, transferred to the main plant.

♦ ♦ ♦

EARL B. CUTTER, for 34 years a member of the sales staff in the Middle

West for the Norton Co., Worcester, retired on Aug. 1. He had his headquarters in Davenport, Iowa, for many years. EARL C. WILLEY, of the company's Chicago office, has been appointed to succeed Mr. Cutter at Davenport.

♦ ♦ ♦

ROBERT WHITEHEAD, an employee of the Falk Corp. for 30 years and at present foreman of the hobs department, was guest of honor at a banquet given by Falk executives, foremen and

supervisors of the corporation at the Pfister Hotel, Milwaukee, in recognition of his long association with the company. The dinner also marked the 50th wedding anniversary of the Whiteheads, who were presented with a pair of gold wrist watches to commemorate this event. Mr. Whitehead came to this country from England 30 years ago.

♦ ♦ ♦

F. A. WRIGHT, associated with Cutler-Hammer, Inc., since 1927, has been

*Follow
Through*

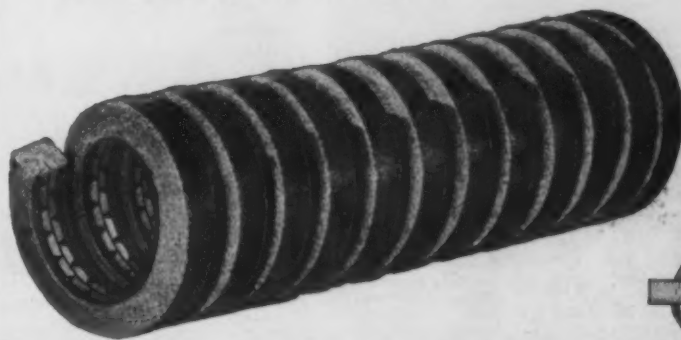


THE golfer who stands out as a long-hitter is the one who *follows through* on his swing, assuring accuracy and long distance. GARLOCK 377 Packing applies this same principle. Strong and tough, GARLOCK 377 *follows through* with long service on steam rods at pressures up to 300 pounds per square inch. Its specially designed metal core—set into an asbestos back—has staggered wearing surfaces, for pressure tight bearing on the rod. Recommended for general steam service.

THE GARLOCK PACKING CO.
PALMYRA, N. Y.

In Canada: The Garlock Packing Company of
Canada Limited, Montreal, Que.

GARLOCK 377



transferred from the company's St. Louis territory to Milwaukee, where he is now manager of resale sales headquarters, a position formerly held by B. M. HORTER, recently appointed sales manager. Mr. Wright has been an active member of the Engineers Club of St. Louis and was also associated with the St. Louis Electrical Board of Trade. He is a graduate of the University of Michigan with a degree in electrical engineering.

♦ ♦ ♦

CHARLES A. DOSTAL, since 1931

manager of the Northwestern district merchandising division of Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has been made manager of sales of the Pacific Coast district, relieving WILLIAM R. MARSHALL, vice-president, so that he may devote his full time to the broad and growing sales interests of the company in this district. Mr. Dostal has been identified with the company for 33 years.

♦ ♦ ♦

MANLEY E. LORD, since 1935 coordinator of all refrigerator manu-

facture for the General Electric Co., Schenectady, N. Y., has been named assistant to W. R. BURROWS, vice-president in charge of manufacture. Mr. Lord's new duties will be in the field of cost reduction and his operations will extend throughout all manufacturing departments of the company. JOSEPH F. ECKEL, who has been associated with Mr. Lord since 1935, succeeds him as coordinator of refrigerator manufacture.

Mr. Lord has been identified with the company since 1908 when he entered the Newark lamp factory and worked up to the position of assistant superintendent in charge of production. In 1917 he went to the Harrison works in charge of general production. After a series of promotions, he was transferred to Schenectady on special production work and in 1930 took charge of the waste and spoilage section, becoming a member of the staff of W. R. Burrows in that same year. He was made coordinator of refrigerator manufacture in 1935.

Mr. Eckel entered the business training course of General Electric in 1916 and later became a member of the cost department of the Schenectady works. In 1927 he was appointed head of the cost department of the refrigerator division and in 1935 was assigned to the manufacturing general department reporting to Mr. Lord.

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F. W. BOYE, III, has been elected vice-president of the Boye & Emmes Machine Tool Co., Cincinnati.

♦ ♦ ♦

W. J. ADAMS, formerly connected with the tractor equipment division of Continental Roll & Steel Foundry Co., East Chicago, has been added to the engineering staff of Gar Wood Industries, Inc., Detroit, which recently took over the tractor equipment division of Continental.

♦ ♦ ♦

EDWIN H. PIERCE has been appointed superintendent, rod and wire department, Portsmouth works of Wheeling Steel Corp., Wheeling, W. Va. Prior to this appointment Mr. Peirce, for 20 years, was associated with the American Steel & Wire Co. at its New England plants as chief metallurgist, superintendent of New Haven works, and later superintendent of the South works at Worcester.

♦ ♦ ♦


T. H. BOOTH has been appointed Cleveland district sales manager, Edgar T. Ward's Sons Co. division of Columbia Steel & Shafting Co., Pittsburgh. He has been with the company

"PRODUCTION INCREASED—WELDING TIME SAVED"
SAY SCORES OF CASE HISTORIES


In case after case, where Murex Electrodes have gone on the job, users report important savings in welding time, increased production, and lower welding costs.

And, with all the economy of Murex Welding, there's never a sacrifice in quality. The Murex line includes electrodes that give sound, X-ray clean deposits that assure beautifully smooth neat welds that meet every requirement for strength and ductility.

Write now, and ask to have our representative demonstrate the Murex Electrode most suited to your needs. At the same time, make use of his broad experience. Let him lend a hand on your welding problems. There is no obligation whatever.

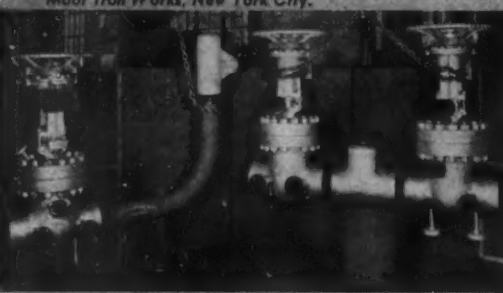


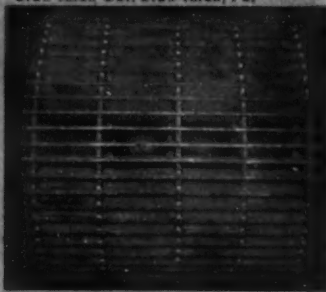
Ask, too, for the handy, pocket-size Murex pamphlet giving information on twenty different Murex Electrodes.



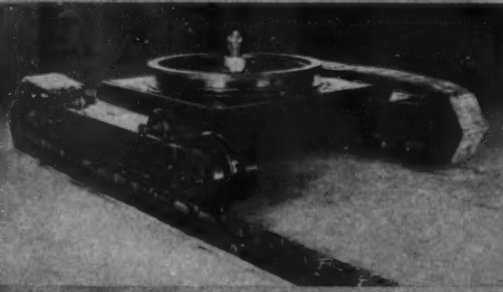
4 In plant after plant welders prefer Murex because smooth clean deposits save time. Photo courtesy Blaw Knox Co., Blaw Knox, Pa.

1 "It's easy to qualify welders with Murex," says one manufacturer of oil refinery equipment. Photo courtesy Edge Moor Iron Works, New York City.






2 Production of fabricated piping was speeded 100% in a Michigan plant. Photo courtesy George B. Limbert Co., E. Chicago, Ind.



5 Murex proved 37.5% faster for heavy downhand work in tests run by a large Detroit manufacturer. Photo courtesy United Welding Co., Middletown, O.



METAL & THERMIT CORPORATION
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 Albany • Chicago • Pittsburgh
 So. San Francisco • Toronto

for a number of years, having been identified with the Cleveland office for the past three years. Mr. Booth succeeds G. E. PARKER, who has been made manager of sales, commercial division, Summerill Tubing Co., Bridgeport, Pa.

♦ ♦ ♦

ROBERT E. BLACK has been appointed to the sales department of the Chicago plant of the Lamson & Sessions Co., Cleveland. He is a graduate of Bryant and Stratton College.

... OBITUARY ...

LEE STANDER, president of the Hauser-Stander Tank Co., Cincinnati, died on July 31, aged 61 years.

♦ ♦ ♦

DONALD GAY, assistant purchasing agent of the Newport News Shipbuilding & Dry Dock Co., died Aug. 6 following an operation.

♦ ♦ ♦

CARL F. KOCH, head of the American Sheet Metal & Iron Works, Milwaukee, died July 27 at a local hospital. He was 63 years old.

♦ ♦ ♦

GLEN T. PURDY, for the past 16 years purchasing agent for Midland Steel Products Co., Detroit, was buried Friday, July 28. Mr. Purdy was born in Leslie, Mich., Feb. 7, 1891, and went to Detroit in 1909. He served as a Lieutenant in the 838th Aerial Squadron during the World War. Mr. Purdy died July 25 in Harper Hospital after an operation.

♦ ♦ ♦

HERBERT MELVILLE BOYLSTON, retired head of the metallurgical department of Case School of Applied Science, Cleveland, died last Saturday at his summer home in Edgartown, Mass., at the age of 58. Before his retirement last September, Mr. Boylston had headed the metallurgical division of Case school for 18 years. Previous to joining the Case staff in 1920, he was a partner in a private company which included himself and the late Prof. Albert Sauveur. He was co-inventor with Prof. Sauveur of a magnetic specimen holder and a vertical magnifier and aided in the development of photomicrographic equipment. Mr. Boylston was the author of a text book on iron and steel and contributed many technical papers to the A.S.M. and A.I.M.E. From 1913 to 1915 he served as secretary of the iron and steel committee of the A.I.M.E. and for several years was chairman of the Cleveland sub-committee on metallurgy.

451,000 Workers on Steel Payrolls During June

BOTH employment and payrolls in the steel industry rose during June, according to the American Iron and Steel Institute. The average of 451,000 employees at work in the industry during June compares with 448,000 in May and with 425,000 in June, 1938.

Total steel payrolls in June

amounted to \$61,150,000, as against \$60,372,000 in May and \$46,706,000 in June of last year.

Wage-earning employees in the industry received an average of 84.8c. per hour in June, compared with average hourly earnings of 83.5c. in May and with 84.5c. in June a year ago.

The number of hours worked per week by wage earners averaged 33.5 in June, as against 32.7 in May and 25.6 in June, 1938.

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may get you there—but



CONSIDER THE COST!



THE NEW

Smart plant executives are lowering production costs by constantly replacing obsolete and worn out machinery. When equipment becomes obsolete, profits cease.

The many new and exclusive improvements provided by STEARNS better engineered magnetic separators and magnetic transmission control devices will help you produce a better product at lower costs. They offer worth while savings, not only in initial costs but also in operating and maintenance expense.

If it's magnetic we make it. Let STEARNS engineers give you the facts. Our engineering facilities and fully equipped, intelligently manned laboratory for tests are available to you. Investigate STEARNS magnetic equipment.

There is a fortune in scrap metal but obsolete magnetic separators, like that on the right, will never give you the efficient and economical job of reclaiming brass, bronze and aluminum borings and turnings as will the modern, improved STEARNS Type "L" shown above.



THE OLD

Write for Bulletin 46 on Stearns Type "L" Magnetic Separators.

SEPARATORS — DRUMS — ROLLS
CLUTCHES — BRAKES — MAGNETS

STEARNS

MAGNETIC MFG. CO.

635 So. 28th Street, Milwaukee, Wis.



... THE NEWS IN BRIEF ...

Largest blast furnace in Britain started.—Page 91.

New type safety glass which reduces eye strain will be used in all 1940 General Motors cars.—Page 92.

General Motors strike ended, work is resumed this week in preparation for new models.—Page 94.

NLRB orders elections for railroad workers in two steel plants.—Page 96.

Temporary injunction against Labor Secretary's minimum steel wages is continued by Court of Appeals.—Page 96.

Congress heads for home with Roosevelt's recovery program in ruins.—Page 98.

Phil Murray Day will be celebrated by steel workers belonging to SWOC.—Page 101.

Government contracts for steel in week ended July 29 total \$645,733.—Page 101.

Japanese shipbuilding at new high level.—Page 101.

Navy Department awards contracts for machine tools, planes, other equipment.—Page 102.

July pig iron output up 7.6 per cent.—Page 102.

Labor Board orders collective bargaining elections for 78,000 automobile workers.—Page 104.

ICC launches general inquiry into rail and water class freight rates.—Page 105.

NLRB, tax structure, steel industry to be investigated during Congressional recess.—Page 105.

British tin plate makers see competition from proposed Australian mills.—Page 106.

Richard Thomas & Co. directors resign.—Page 106.

South Africa to control exports of scrap.—Page 107.

South Africa extending steel manufacture.—Page 107.

Connors Steel Co. installs an electric furnace, first of its type in Birmingham area.—Page 108.

Eighteen of each 100 workers in U. S. idle now; 29 of 100 jobless in 1933.—Page 108.

Employment in steel industry for June rises to 451,000; payrolls higher.—Page 108.

Gary, Ind., merchants push use of "Gary-made" steel.—Page 108.

Consolidated Steel first half earnings \$62,071.—Page 109.

Gear Makers plan fall meeting.—Page 109.

National defense appropriations almost doubled by recent Congress.—Page 109.

CIO unit calls off 86-day strike at Milwaukee plant.—Page 109.

Social Security law revision will save employers \$825,000,000 in three years.—Page 116.

Chicago Bridge & Iron Co. observes its 50th anniversary.—Page 116.

NLRB asks court to uphold order for Republic Steel Corp. to reinstate 5000 employees, makes exception of bomb users.—Page 117.

O'Mahoney credits TNEC with passage of five patent abuse measures.—Page 117.

Two of five investigators into Labor Board activities have pro-labor records.—Page 118.

Steel ingot production of 3,288,949 gross tons in July second only to that of March.—Page 118.

Standard Steel Spring earns \$1 a share.—Page 120.

Steel Imports - Exports for June.—Page 120.

Bureau of Standards completes determinations of properties of steam.—Page 120.

Steel products produced for sale in second quarter and first half.—Page 121.

Australia to build ships by Government subsidy.—Page 136.

Two steel companies to use standard's process.—Page 136.

Domestic machine tool sales are spotty, but combined with foreign business machine tool builders find demand steady. Active fall buying is looked for.—Page 140.

Farm equipment imports in first half of 1939 are third under like period in 1938.

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MEETINGS

- Aug. 28 and 29—Institute of Scrap Iron and Steel, Cleveland.
- Aug. 28 to 31—American Mining Congress, Salt Lake City.
- Sept. 4 to 8—British-American Engineering Congress, New York.
- Sept. 8 and 9—American Ceramic Society, Conneaut Lake, Pa.
- Sept. 20 to 22—National Industrial Advertisers Association, New York.
- Sept. 26 to 29—Association of Iron and Steel Engineers, Pittsburgh.
- Oct. 4 to 13—National Machine Tool Builders' Association, Cleveland.
- Oct. 5 to 7—Society of Automotive Engineers, aircraft production meeting, Los Angeles.
- Oct. 6 to 7—Foundry Equipment Manufacturers Association, White Sulphur Springs, W. Va.
- Oct. 16—Society of Automotive Engineers, annual dinner, New York.
- Oct. 16 to 20—National Safety Congress and Exposition, Atlantic City, N. J.
- Oct. 23 to 27—National Metal Congress, Chicago.
- Nov. 16 and 17—Porcelain Enamel Institute, New York.

WORKS LIKE

MAGIC

So speedy and accurate is the Cyclone Tempering Furnace that heat treaters, accustomed to old fashioned low capacity tempering equipment with wide hardness variations, frequently won't believe that a dense, 1400 lb. load of small castle nuts like that shown here can be tempered to Rockwell limits of plus or minus 1-point "C." But that and other jobs formerly considered impossible are being done every day by Cyclone users and there's no magic about it either. The whole secret of the Cyclone's amazing speed and accuracy is in the super-powerful blast of accurately heated air that drives through any charge, no matter how dense, at a velocity exceeding two miles a minute. Put this spectacular performance to work in your own plant. Drive your rejections down, your production and profits UP with the Cyclone Tempering Furnace. Bulletin available on request.

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1400 lbs. of machine nuts here and Cyclone Tempering brings them out within plus or minus 1-point Rockwell "C."

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Social Security Law Revision To Save Employers \$825,000,000

WASHINGTON—Employers will save \$825,000,000 during the next three years under amendments to the social security law approved by Congress just before adjournment. Probably of more immediate benefit to business than was the elimination of the undistributed profits tax, the social

security amendments will effect the saving because they freeze the 1 per cent payroll tax for three years instead of allowing it to go to 1½ per cent next year. Tax savings to both employers and employees are expected to amount to \$905,000,000 for the three-year period.

Just as the social security law was passed to offset agitation for enactment of the Townsend old-age and similar plans five years ago, so the amendments just approved were designed to liberalize benefits for the aged to head off "crack-pot" pension schemes. In addition to relieving the tax burden on employers and employees, the approved bill makes these changes in existing law:

Advances from 1942 to 1940 the date when old-age insurance benefits will start.

Raise from \$15 to \$20 the amount the government will contribute on a 50-50 matching basis with the states for old-age assistance.

Retention in substantially their present form provisions allowing states to reduce taxes for unemployment compensation programs after three years' experience under their individual systems.

Liberalize the old-age insurance program for aged wives, widows, children and aged dependent parents and increase Federal grants to states for maternal and child welfare vocational rehabilitation and public health work.

Payment of pensions to 200,000 more elderly persons than are entitled to them under existing law will make it possible, some authorities said, for some recipients to get back in pensions during the first two months more than their total contributions to the fund.

Amendments to the social security law, tied up by conferees for weeks because they were unable to iron out differences between the House and Senate versions had been given up as lost when an eleventh-hour revival brought rapid action in both Houses.

Chicago Bridge & Iron Has 50th Birthday

CHICAGO—The Chicago Bridge & Iron Co., which operates throughout the world from its headquarters in Chicago, is observing its 50th anniversary this week. Founded Aug. 8, 1889, by Horace E. Horton, the company has grown to an enterprise which has shipped all over the world the steel fabricated for bridges, tanks and other structures in its plants at Chicago, Greenville, Pa., and Birmingham. A booklet outlining a half-century of progress in steel construction has been released in conjunction with the anniversary celebration.

*You don't have to
raise the roof . . .*



**New
NORTHERN HI-LIFT HOIST
Gives You MORE HEADROOM**

Headroom costs plenty when you have to build it into the plant. Every inch of height eliminated makes substantial saving. • The New Northern Hi-Lift Hoist enables you to get along with less total headroom because it uses more that is already available. It lifts close to its supporting beam—allowing higher piling in storage space—easier handling of bulky loads everywhere. • It is stronger—has more lifting power. All mechanism is completely accessible. Mechanical brake parts may be removed without opening the gear case. • A variety of sizes and types—Northern is a long life, low cost Hoist.

NORTHERN ENGINEERING WORKS

Detroit, Michigan

CRANES *Northern* **HOISTS**

Needn't Rehire Bombers in '37 Strike, NLRB Tells Republic

REINSTATEMENT of 5000 Republic Steel Corp. employees, with back pay, is sought by the National Labor Relations Board in a request to the Circuit Court of Appeals at Philadelphia that a board order for such reinstatements be upheld.

The Labor Board, which charged in a brief filed with the court that the steel company had illegally supported a plan of employee representation (opposed in its campaign for membership by the SWOC) said, however, that alleged "illegal acts" of strikers in Republic plants "do not constitute a bar to the reinstatement of any of the strikers, except those who pleaded guilty to the possession and use of explosives and the malicious destruction of property to the value of \$300 and those who were convicted of possession of a bomb."

Republic has filed a suit under the anti-trust act, asking \$7,500,000 damages from the SWOC for alleged violence committed by the strikers. Decision has been reserved by the court on Republic's plea that the NLRB rehiring order be set aside on grounds that it is contrary to law and punitive in nature.

Among the charges of unfair labor practices made by the board were announcements that Republic "would not sign any contract with the union." Although the disorders at entrances to the steel company's mills during the strike of 1937 were caused by efforts to keep the mills running with employees who wanted to work, the NLRB describes the Republic strike as this "lockout" of May 20. While the steel company has charged that the SWOC called the strike in the absence of any genuine differences between the corporation and its employees, the Labor Board said that the steel union had to fight for its life or be destroyed.

TNEC Takes Credit for Patent Abuse Bills

WASHINGTON — Senator Joseph C. O'Mahoney, TNEC chairman, gave the Temporary National Economic Committee credit this week for passage by Congress of five bills designed to expedite procedure and prevent abuses of the patent privilege. He said that the TNEC plans to sponsor further changes next ses-

sion. The amendments enacted by Congress would:

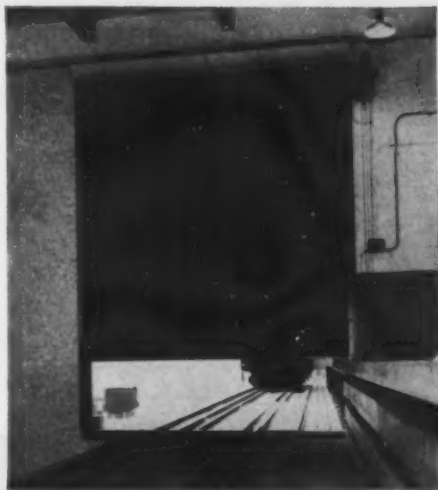
Reduce the number of hearings in applications for patents; reduce from two years to one the period during which an inventor may publicly use his invention before applying for a

patent; and abolish renewal applications for patents;

Reduce the time within which a person can contest a patent on the claim he is a prior inventor; and permit the Commissioner of patents to require applicants to reply to official communications in less than the six months allowed at present.

Another bill would have limited patent protection to 20 years from the date of filing patent application but only the Senate passed the measure.

TWELVE WAYS THEY SAVE



KINNEAR ROLLING DOORS

If your service door equipment never had to be replaced or repaired . . . if it never held up traffic, or occupied usable floor or wall space . . . and could be opened and closed instantly and effortlessly every time — then you'd know those doors were saving you money — plenty of money. You can come mighty close to getting just that sort of door service with Kinnear Rolling Doors. And that's no idle claim — it's been proved, in hundreds of plants similar to yours, over a period of more than forty years! Let us send you complete details on these cost-cutting doors.

ALL STEEL CURTAIN REPELS FIRE — IS ALMOST WEARPROOF!

COILS COMPACTLY ABOVE THE OPENING

OPENS OUT OF REACH OF WIND AND TRUCKS

EFFECTIVELY COUNTER-BALANCED FOR SMOOTH, EASY OPERATION

VERTICAL OPERATION SAVES USABLE SPACE

RUGGED CONSTRUCTION DEFIES INTRUSION

INTERLOCKING SLATS ARE WEATHERPROOF!

CAN'T SAG, WARP, SPLIT, PULL APART!

HOT-DIP GALVANIZED TO RESIST RUST AND THE ELEMENTS

FLEXIBLE ASSEMBLY ABSORBS PUNISHMENT

INDIVIDUAL SLATS EASILY REPLACEABLE

BACKED BY NATION-WIDE ORGANIZATION

Offices and Agents in All Principal Cities

THE KINNEAR MANUFACTURING COMPANY

1760-80 FIELDS AVENUE

COLUMBUS, OHIO

Factories: Columbus, Ohio and San Francisco, Cal.

Steel Production in July Second Only to March

PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS (Reported by Companies Which in 1936 Made 98.67 Per Cent of the Open-Hearth and 100 Per Cent of the Bessemer Ingot Production)

1938	Reported Production (Gross Tons)		Calculated Production All Companies		Number of Weeks	Per Cent of Capacity
	Open-Hearth	Bessemer	Monthly	Weekly		
January	1,612,469	99,941	1,734,165	391,459	4.43	29.17
February	1,551,082	125,443	1,697,452	424,363	4.00	31.63
March	1,821,935	157,687	2,004,204	452,416	4.43	33.72
1st Quarter ..	4,985,486	383,071	5,435,821	422,692	12.86	31.50
April	1,763,154	131,594	1,919,042	447,329	4.29	33.34
May	1,647,231	130,540	1,800,877	406,519	4.43	30.30
June	1,493,564	118,638	1,632,843	380,616	4.29	28.36
2nd Quarter ..	4,903,949	380,772	5,352,762	411,434	13.01	30.66
1st 6 Months ..	9,889,435	763,843	10,788,582	417,031	25.87	31.08
July	1,821,740	127,932	1,974,317	446,678	4.42	33.25
August	2,309,207	196,739	2,537,102	572,709	4.43	42.68
September	2,407,707	206,937	2,647,129	618,488	4.28	46.09
3rd Quarter ..	6,538,654	531,608	7,158,548	545,205	13.13	40.63
9 Months	16,428,089	1,295,451	17,947,131	460,183	39.00	34.29
October	2,844,450	223,158	3,105,985	701,125	4.43	52.25
November	3,312,475	201,196	3,558,363	829,455	4.29	61.81
December	2,932,272	158,912	3,130,746	708,314	4.42	52.79
4th Quarter ..	9,089,197	583,266	9,795,094	745,441	13.14	55.55
Total	25,517,286	1,878,717	27,742,225	532,072	52.14	39.65
1939						
January	2,986,455	147,494	3,174,352	716,558	4.43	52.48
February	2,755,130	196,186	2,988,649	747,162	4.00	54.72
March	3,167,782	194,694	3,405,370	768,707	4.43	56.30
1st Quarter ..	8,909,367	538,374	9,568,371	744,041	12.86	54.49
April	2,731,451	205,771	2,974,246	693,297	4.29	50.78
May	2,715,940	170,156	2,922,875	659,791	4.43	48.32
June	2,898,552	187,478	3,125,288	728,505	4.29	53.35
2nd Quarter ..	8,345,943	563,405	9,022,409	693,498	13.01	50.79
1st 6 Months ..	17,255,310	1,101,779	18,590,780	718,623	25.87	52.63
July	3,006,892	241,284	3,288,949	744,106	4.42	54.50

Figures for 1938 and January through June, 1939, have been revised.

TONNAGE of steel ingots produced in July was the second highest of the year, according to the monthly report of the American Iron and Steel Institute.

The July total of 3,288,949 gross tons of open hearth and bessemer steel ingots compares with the revised figure of 3,125,288 gross tons for June, and was exceeded in 1939 only by the revised March tonnage of 3,405,370 gross tons. In July of last year production amounted to 1,974,317 gross tons.

Ingot operations during July represented 54.50 per cent of the industry's capacity as against 53.35 per cent in June. In July, 1938, the industry operated at 33.29 per cent of capacity.

Steel ingot production in July averaged 744,106 gross tons a week, which compares with 728,505 gross tons a week in June and with 446,678 gross tons a week in July, 1938.

Two of Five NLRB Probers Have Pro-Labor Records

WASHINGTON — The congressional committee designated to conduct a sweeping investigation of the National Labor Relations Board and its administration of the Wagner Act is scheduled to hold its first meeting on Sept. 7. Public hearings, some of which will be held at various places throughout the country, probably will not begin until early in October.

Committee members selected by Speaker Bankhead shortly before Congress adjourned include:

Democrats — Representatives Howard W. Smith, of Virginia, sponsor of the resolution and a member of Congress since 1931, chairman; Arthur D. Healey of Massachusetts, co-author of the Walsh-Healey Public Contracts Act and recognized as a friend of labor; and Abe Murdock of Utah, in Congress since 1933 with a pro-labor record.

Republicans — Representatives Charles A. Halleck of Indiana, who has been in Congress since 1935, voted to investigate the sit-down strike, the NLRB and against the Fair Labor Standards Act; and Harry N. Routzohn of Ohio, former assistant United States district attorney, and a newcomer to the 76th Congress, who defeated the New Deal incumbent last November.

WORTHINGTON PUMP, BUFFALO "DRESSED UP" IN Careystone Corrugated Siding



The exterior of the foundry and machine shops of The Worthington Pump & Machinery Company, Buffalo, have been modernized with Careystone Corrugated Asbestos-Cement Siding — 230 squares were used on the job. Pleasingly modern in appearance; fireproof, rot-proof and rust-proof; requiring no paint or other upkeep; this improvement represents the new trend to permanence and low maintenance of industrial buildings. Write today for full details of this modern industrial roofing and siding — address Dept. 26.

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Roofing . . . Flooring . . . Insulation . . . Boat Coverings and Canvas
Waterproofing Materials . . . Expansion Joint . . . Asbestos Paper and Millboard
THE PHILIP CAREY COMPANY • Lockland, Cincinnati, Ohio
Dependable Products Since 1873
BRANCHES IN PRINCIPAL CITIES

CANADA

... Outlook bright for further armament business from abroad.

TORONTO, Aug. 8—While Canadian industrial operations are currently curtailed owing to the summer holiday season and production is marking time, the outlook for new business for the closing months of this year is bright. Heads of several Canadian companies now are in Europe negotiating for new business, and at least one European Government official is in Canada securing information on airplane and armament equipment. It appears that further large orders for armament from Great Britain are imminent. R. J. Magor, president of National Steel Car Corp., Hamilton, Ont., has been in Britain for some time in connection with armament orders, while V. M. Drury, president of Canadian Car & Foundry Co., recently left for Europe to seek new business. It is understood that National Steel Car is negotiating for an order for 140 bombers from the French Government.

Dominion Steel & Coal Corp., is spending upward of \$1,000,000 bringing its Sydney, N. S., works up-to-date. Two new open hearth furnaces are being installed to replace smaller ones that have been in operation for many years.

At a meeting of directors of Steel Co. of Canada, Ltd., Hamilton, Ont., a number of by-laws were passed, including one to enable directors to raise capital for the contemplated \$10,000,000 continuous strip mill. However, it was announced that general business conditions are not favorable for such a large undertaking at this time and no action toward construction of the mill will be undertaken until business conditions improve.

Domestic demand for iron and steel has slowed down seasonally and sales are at the minimum rate for the year.

Merchant pig iron demand has dropped sharply during the past couple of weeks. The listless interest in iron largely is due to the fact that prices appear to be fairly well stabilized for the immediate future and melters are not worrying about being caught short on a rising market. Iron production in June fell 8.5 per cent from May, to total 52,805 gross tons, of which 50,178 tons was basic for further use of producing companies, 399 tons was foundry iron and 2228 tons was malleable iron. Five blast furnaces are blowing.



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SPRINGS
WIRE
SPECIALTIES
WIRE FORMS**

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LOCK SPRINGS
SPECIAL
SPRINGS**

*from Every Type
of Wire up to &
including 1/2 dia*

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AMERICAN SPRING

AND MANUFACTURING CORPORATION
PARK AVE. HOLLY MICHIGAN

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S. A. E.

STEELS

Immediate Shipment from Six Warehouses

Aircraft quality, electric furnace S.A.E.
X-4130 and X-4340, subject to magni-
flux test and conforming to Army and
Navy Specifications, in stock in hot rolled
and cold drawn sizes. Forgings of all
types.

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CLEVELAND

CHICAGO

NEWARK

DETROIT

BUFFALO

Iron and Steel Exports (In Gross Tons)

	June		Six Months Ended June	
	1939	1938	1939	1938
Pig iron	7,689	24,639	27,933	215,780
Ferromanganese and Spiegeleisen	2	64	38	223
Other ferroalloys	293	102	677	652
Scrap, iron and steel	397,321	160,577	1,776,015	1,785,372
Scrap, tin plate	732	999	7,807	8,831
Waste-waste tin plate	835	490	5,130	4,110
Pig iron, ferroalloys and scrap	406,872	186,871	1,817,600	2,014,968
Ingots, blooms, billets, sheet bars	8,402	10,383	49,164	118,418
Ingots, etc., alloy steel, including stainless	252	188	6,608	4,899
Skelp	1,009	429	4,637	6,618
Wire rods	3,564	3,392	10,603	16,967
Semi-finished steel	13,227	14,392	710,012	1,166,902
Bars, plain and reinforcing	14,478	11,789	71,914	78,733
Bars, alloy steel	1,045	218	7,394	2,227
Bars, stainless steel	5	13	193	210
Iron bars	43	159	311	814
Plates, plain and fabricated	26,820	14,129	132,356	118,091
Plates, alloy steel	285	129	687	1,950
Plates, stainless	4	2	40	134
Sheets, galvanized steel	7,948	6,622	43,522	33,543
Sheets, galvanized iron	298	451	2,663	2,000
Sheets, black, plain steel	20,137	15,406	132,425	99,394
Sheets, alloy steel	164	358	1,545	2,289
Sheets, stainless	63	141	433	799
Sheets, black iron	561	937	3,337	3,422
Hoops, bands, strips, plain steel	4,979	4,947	33,658	30,109
Hoops, bands, strip steel alloy	46	46	261	158
Hoops, bands, strip steel, stainless	58	50	442	282
Tin plate and taggers' tin	25,718	12,840	98,955	89,228
Terne plate (incl. long ternes)	386	346	1,929	2,557
Structural shapes, plain material	10,030	7,428	41,669	49,436
Structural material, fabricated	5,311	2,830	16,554	20,119
Sheet piling	1,119	116	2,935	1,869
Tanks, steel	4,763	3,536	13,561	17,402
Steel rails	8,936	1,110	33,108	38,767
Rail fastenings, switches, spikes, etc.	1,783	657	8,385	5,627
Boiler tubes	853	1,293	3,739	4,831
Casing and oil line pipe	5,757	3,859	35,677	46,877
Pipe, black and galv. welded steel	3,090	1,831	18,849	10,986
Pipe, black and galv. welded iron	500	494	2,979	2,471
Plain and galvanized wire	5,374	4,455	25,528	21,137
Barbed wire and woven wire products	5,288	3,412	22,263	12,916
Wire rope and other products	1,314	885	6,205	5,379
Nails and tacks	2,614	2,007	11,763	10,500
Bolts, nuts, rivets and washers except track ..	719	604	3,995	4,136
Other finished steel	799	177	3,418	2,038
Rolled and finished steel	159,188	103,277	782,693	720,431
Cast iron pipe and fittings	5,048	2,418	17,307	11,720
Malleable iron screwed fittings	344	230	1,801	1,536
Car wheels and axles	2,554	3,561	12,033	12,238
Castings, iron and steel	486	533	2,846	3,238
Castings, alloy steel, incl. stainless	123	156	737	439
Forgings, plain	666	640	4,972	4,038
Forgings, alloy steel, incl. stainless	348	25	1,226	237
Castings and forgings	9,569	7,563	40,922	33,446
Total	588,856	312,103	2,712,227	2,915,747

Iron and Steel Imports (In Gross Tons)

	June		Six Months Ended June	
	1939	1938	1939	1938
Pig iron	4,276	900	15,854	20,365
Sponge iron	262	1	871	318
Ferromanganese ¹	2,494	793	18,508	5,069
Spiegeleisen	5,792	212	13,969	4,824
Ferrosilicon ²	3	34	93	71
Ferrosilicon ³	151	27	796	278
Other ferro-alloys ⁴ .....	.....	.....	132	1
Scrap	2,537	314	14,803	1,170
Pig iron, ferroalloys and scrap	15,515	2,281	65,026	32,096
Steel ingots, blooms, etc.	79	32	4	4
Billets, whether solid or hollow	782	327	5,011	2,520
Wire rods	861	359	5,220	2,901
Semi-finished steel	399	52	1,980	573
Concrete reinforcement bars	96	9	636	429
Hollow steel bars	2,092	2,043	10,454	10,498
Iron slabs .....	.....	.....	.....	.....
Iron bars	37	27	313	311
Boiler and other plate (including skelp) ..	14	.....	19	110
Sheets, skelp, and saw plate	57	381	1,033	5,175
Die blocks or blanks, etc. ....	.....	29	80	64
Tin plate, taggers' tin and terne plate ..	12	3	36	30
Structural shapes	5,183	3,599	25,875	21,947
Sashes and frames .....	.....	.....	5	.....
Sheet piling .....	.....	.....	462	.....
Rails and track material	1,341	84	4,227	1,752
Welded pipe	280	622	3,622	2,433
Other pipe	400	1,930	24,246	12,764
Cotton ties	1,032	222	1,065	246
Other hoops and bands	1,849	1,806	10,890	9,689
Barbed wire	1,883	866	10,258	7,826
Round iron and steel wire	128	49	1,298	577
Telegraph and telephone wire .....	.....	.....	2	5
Flat wire and steel strips	261	154	1,570	1,353
Wire rope and strand	116	178	1,055	1,119
Other wire	125	160	1,116	822
Nails, tacks, and staples	735	543	4,903	3,471
Bolts, nuts, and rivets	3	21	63	81
Horse and mule shoes	7	68	203	215
Rolled and finished steel	16,050	12,846	105,411	81,496
Malleable iron pipe fittings	78	.....	102	37
Cast iron pipe and fittings	36	18	387	876
Castings and forgings	47	383	848	1,585
Total	32,587	15,887	176,994	118,985

¹ Manganese content; ² chrome content; ³ silicon content; ⁴ alloy content.

Steel Imports—Exports for June

United States Imports of Pig Iron by Countries of Origin

	June		Six Months Ended June	
	1939	1938	1939	1938
United Kingdom .....	.....	.....	.....	42
British India	2,263	500	9,506	10,159
Germany .....	.....	.....	.....	.....
Netherlands	1,802	100	4,837	5,462
Canada	211	100	1,311	1,161
France .....	.....	.....	.....	.....
Belgium .....	.....	.....	.....	.....
Norway .....	.....	200	.....	3,338
Sweden .....	.....	.....	100	.....
Russia .....	.....	.....	.....	.....
All others .....	.....	.....	100	.....
Total	4,276	900	15,854	20,166

June Imports of Iron and Manganese Ores

	June		Six Months Ended June	
	1939	1938	1939	1938
Canada	75	121	.....	.....
Cuba	21,594	11,000	1,400	1,638
Chile	123,250	143,650	.....	.....
Spain .....	.....	.....	.....	.....
Norway	22,735	.....	.....	.....
Sweden	14,282	15,571	.....	.....
French Africa .....	.....	.....	.....	.....
Russia .....	.....	.....	4,208	4,463
India .....	.....	.....	3,890	550
Brazil .....	.....	.....	.....	.....
Gold Coast .....	.....	.....	5,911	1,889
Other countries	7,220	.....	14	.....
Total	189,156	170,342	15,423	7,742

Standards Bureau Studies Properties of Steam

WASHINGTON—The Bureau of Standards reports that mechanical engineers are expected in all countries to benefit from a series of determinations of the properties of steam which it recently completed.

The measurements cover the properties of water and saturated steam in the range from 32 deg. to 705 deg. F.; that is, between the point at which water freezes and the so-called critical region where the pressure is about 3200 lb. per square in., and were made in several stages, each of which covered a particular temperature interval. Some of the results already have been published in steam tables in this country, Great Britain and Germany.

Standard Steel Spring Earns \$1 a Share

STANDARD STEEL SPRING CO., Coraopolis, Pa., reports for the six months ended June 30, 1939, a net profit of \$215,584 after depreciation, interest and taxes, equal to \$1.00 a share on 214,712 shares of common stock. This compares with a net profit of \$36,655 or 18c. a share on 198,962 shares in the first half of 1938.

Steel Products Produced for Sale In Second Quarter and First Half

THE American Iron and Steel Institute reports a total of 6,416,520 gross tons of finished iron and steel produced for sale in the second quarter, making a total of 12,958,629 tons in the first half. These totals do not include steel sold to other members of the trade for further conversion. Cold reduced tin plate led all steel products in the second quarter with an operation of 90.1 per cent of capacity compared with only 31.8 per cent for hot mill plate. Detailed figures on all products are given in the table.

AMERICAN IRON AND STEEL INSTITUTE
Capacity and Production for Sale of Iron and Steel Products

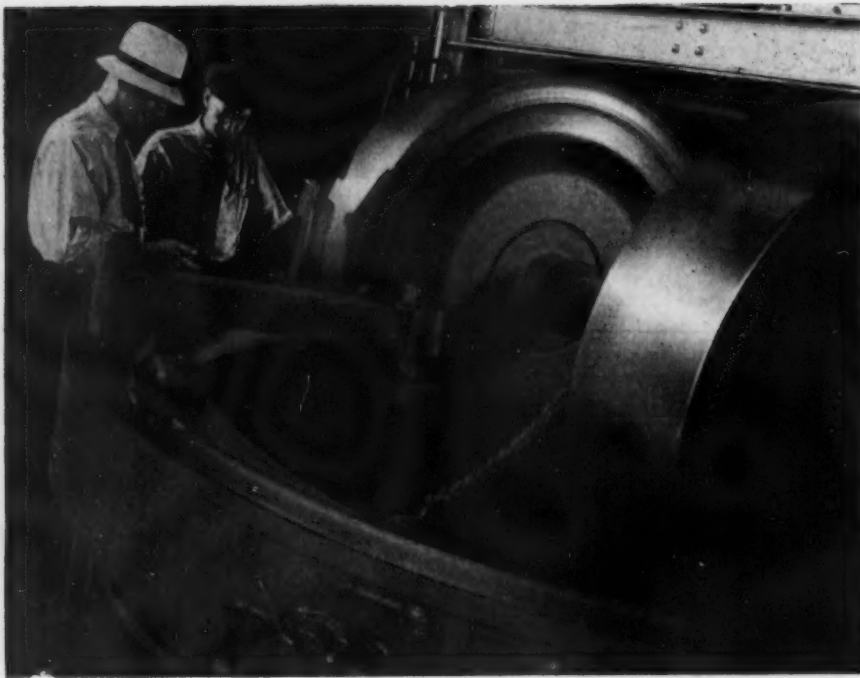
Second Quarter - 1939

	Number of companies	Items	Annual Capacity Gross tons	PRODUCTION FOR SALE—GROSS TONS						To Date (6 Months 1939)				
				Current Quarter			Shipments			To Date			Shipments	
				Total	Per cent of capacity	Export	To members of the industry for conversion into further finished products	Total	Per Cent of capacity	Export	To members of the industry for conversion into further finished products			
Ingot, blooms, billets, slabs, sheet bars, etc.	31	1	XXXXXX	481,763	XXX.	14,490	342,203	1,099,838	XXX	32,962	734,830			
Heavy structural shapes	8	2	4,691,800	474,295	40.4	22,671	-	933,213	39.8	38,462	XXXXXX			
Steel piling	3	3	234,300	33,330	56.9	2,374	-	61,733	52.7	3,292	XXXXXX			
Plates—Sheared and Universal	19	4	5,828,310	504,795	34.6	70,096	4,490	1,007,908	34.6	109,937	7,045			
Skalp	7	5	XXXXXX	98,431	XXX	1,696	73,565	186,316	XXX	2,411	140,524			
Rails—Standard (over 60 lbs.)	4	6	3,592,500	361,907	42.6	3,015	-	631,668	37.2	6,493	XXXXXX			
Light (60 lbs. and under)	6	7	418,500	14,291	13.7	7,958	-	33,890	16.2	13,248	XXXXXX			
All other (Incl. girder, guard, etc.)	2	8	105,000	10,224	38.9	415	-	14,113	26.9	1,367	XXXXXX			
Splice bar and tie plates	14	9	1,290,550	140,620	43.6	1,268	-	237,080	36.7	2,683	XXXXXX			
Bars—Merchant	34	10	XXXXXX	594,803	XXX	22,194	71,554	1,266,361	XXX	40,057	128,744			
Concrete reinforcing—New billet	13	11	XXXXXX	232,329	XXX	14,373	-	410,418	XXX	27,372	XXXXXX			
Rerolling	19	12	XXXXXX	43,152	XXX	1,871	-	74,463	XXX	4,536	XXXXXX			
Cold finished—Carbon	18	13	XXXXXX	101,860	XXX	815	-	215,658	XXX	2,338	XXXXXX			
Alloy—Hot rolled	14	14	XXXXXX	116,440	XXX	4,885	10,653	268,955	XXX	10,548	22,603			
Cold finished	14	15	XXXXXX	11,722	XXX	45	-	25,296	XXX	127	XXXXXX			
Hoops and baling bands	4	16	XXXXXX	15,534	XXX	161	-	27,549	XXX	344	XXXXXX			
TOTAL BARS	53	17	11,550,720	1,115,340	38.6	44,344	68,207	2,288,700	39.6	85,322	151,347			
Tool steel bars (rolled and forged)	15	18	94,160	8,443	35.9	454	-	16,308	34.6	1,126	XXXXXX			
Pipe and tube—B. W.	15	19	1,623,800	179,240	44.2	6,858	-	345,624	42.6	13,253	XXXXXX			
L. W.	11	20	1,316,580	68,723	20.9	2,904	-	132,963	20.2	4,586	XXXXXX			
Electric weld	4	21	615,000	28,856	34.4	2,405	-	81,819	26.6	3,555	XXXXXX			
Seamless	15	22	2,968,900	289,963	38.3	17,209	-	582,799	39.3	33,223	XXXXXX			
Conduit	6	23	133,670	14,267	37.1	398	-	27,534	35.8	846	XXXXXX			
Mechanical Tubing	5	24	182,100	20,962	46.0	1,097	-	44,083	48.4	1,903	XXXXXX			
Wire rods	19	25	XXXXXX	153,342	XXX	9,141	44,166	278,354	XXX	13,640	92,185			
Wire—Drawn	38	26	1,970,195	261,269	53.0	14,465	2,983	515,558	52.3	28,117	6,811			
Nails and staples	19	27	1,080,760	121,450	44.9	7,135	-	268,754	49.7	12,007	XXXXXX			
Barbed and twisted	16	28	428,075	50,391	47.1	12,705	-	100,138	46.8	20,548	XXXXXX			
Woven wire fence	13	29	695,330	66,040	38.0	504	-	134,733	38.8	894	XXXXXX			
Bale ties	11	30	110,680	15,955	57.6	35	-	24,219	43.8	56	XXXXXX			
All other wire products	5	31	24,580	1,129	18.5	7	-	2,222	18.2	12	XXXXXX			
Fence posts	12	32	134,700	15,429	45.8	308	-	28,092	41.7	594	XXXXXX			
Black plate	12	33	462,815	76,601	66.2	1,809	25,460	156,908	67.8	2,833	53,457			
Tin plate—Hot rolled	10	34	1,540,360	122,544	31.8	21,905	-	244,739	31.8	39,541	XXXXXX			
Cold reduced	10	35	1,923,200	433,364	90.1	40,053	-	733,068	76.2	66,036	XXXXXX			
Sheets—Hot rolled	25	36	XXXXXX	790,951	XXX	51,370	34,516	1,718,372	XXX	107,575	64,245			
Galvanized	16	37	XXXXXX	255,268	XXX	25,855	-	530,320	XXX	46,813	XXXXXX			
Cold rolled	18	38	XXXXXX	356,642	XXX	17,365	5	785,119	XXX	55,084	XXXXXX			
All other	16	39	XXXXXX	89,229	XXX	2,384	-	188,951	XXX	6,656	XXXXXX			
TOTAL SHEETS	27	40	11,315,065	1,492,090	52.7	97,114	34,521	3,222,742	57.0	216,128	64,245			
Strip—Hot rolled	24	41	3,209,300	210,287	26.2	6,609	27,771	467,140	29.1	13,876	62,983			
Cold rolled	36	42	1,160,910	109,695	37.8	1,528	-	246,369	42.4	4,191	XXXXXX			
Wheels (car, rolled steel)	5	43	380,320	24,204	25.5	154	-	50,121	26.4	679	XXXXXX			
Axles	5	44	425,900	10,223	9.6	2,122	-	19,444	9.1	2,324	XXXXXX			
Track spikes	11	45	299,350	29,280	39.1	421	-	50,970	34.1	917	XXXXXX			
All other	4	46	9,450	2,669	113.0	59	-	4,828	102.2	86	XXXXXX			
TOTAL STEEL PRODUCTS	135	47	XXXXXX	7,039,888	XXX	415,704	623,368	14,273,988	XXX	771,768	1,315,359			

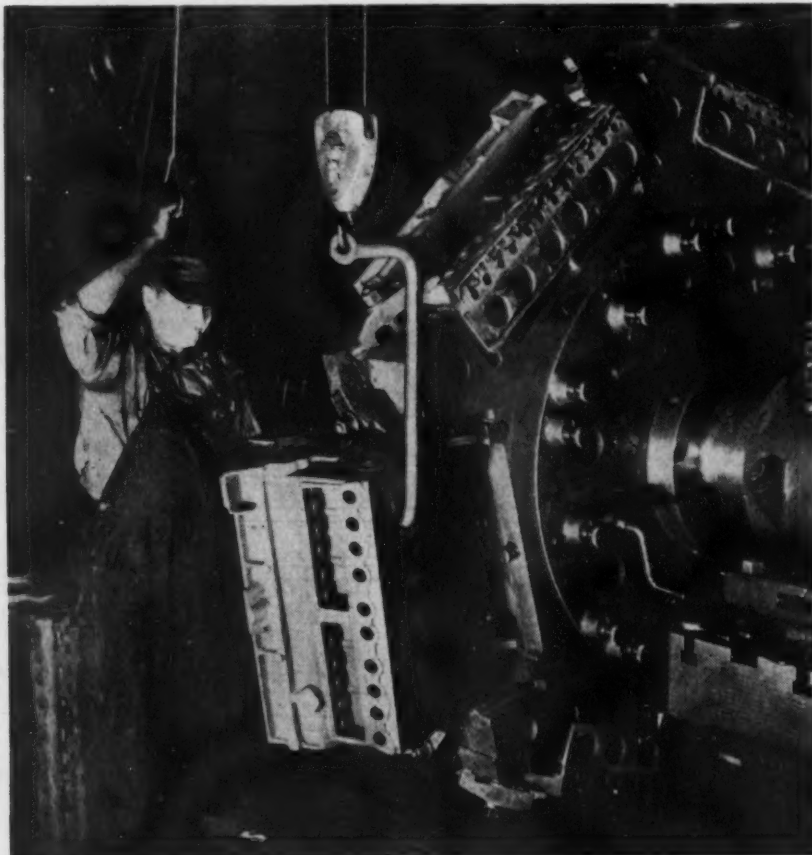
Estimated total steel finishing capacity based on a yield from ingots of	70.0%	48	48,514,000	XXXXXX	52.9	XXXX	XXXXXX	XXXXXX	53.4	XXXXXX	XXXXXX			
Pig iron, ferro manganese and spiegel	28	49	XXXXXX	731,449	XXX	14,134	213,688	1,625,989	XXX	21,899	398,079			
Ingot moulds	4	50	XXXXXX	50,938	XXX	329	-	118,405	XXX	329	XXXXXX			
Bars	9	51	147,200	6,312	17.2	27	251	13,187	17.9	56	665			
Pipe and tubes	3	52	97,730	10,598	43.4	172	-	19,645	40.2	304	XXXXXX			
All other	2	53	63,560	3,088	19.4	143	1,287	5,709	18.0	671	2,242			
TOTAL IRON PRODUCTS (ITEMS 51 to 53)	11	54	250,550	19,998	31.9	342	1,518	38,541	30.8	991	2,907			

Total number of companies included - 156

Total steel products produced for sale, less shipments to members of the industry for conversion into further finished products Current quarter 6,416,520 G.T. — 52.9 % of Finishing Capacity
To date 12,958,629 G.T. — 53.4 % of Finishing Capacity
The above tonnages represent 70.9% of the ingots produced by companies whose products are included above



NEW foundry sand handling system at Cadillac-LaSalle includes two of the largest mixing machines ever built for American industry, according to Nicholas Dreystadt, general manager. They are Muller machines with a capacity of 3,000 lb. of sand each and with such efficiency that a full charge of sand can be treated within two minutes. Each machine weighs 36,000 lb. and the mixing wheels weigh 4,000 lb. each. So far as is known, only one other similar machine is larger. At the completion of the mixing process, the charge is automatically expelled onto a conveyor that carries the sand to storage bins. A quarter mile of belt in nine conveyor systems is used altogether—to carry the sand to 150-ton storage bins, fluffing and surge bins, and later to move the sand to sand-molding machines throughout the foundry. The equipment is expected to increase production facilities and also supplement the benefits already derived from new air-conditioning units. L. W. THAYER and JOHN DORNECCEUR, general foreman of the foundry, are shown in the photograph.



REINFORCING STEEL

ATLANTIC STATES AWARDS

- 730 Tons, Huntingdon & Franklin Counties, Pa., Tuscarora Mt. tunnel, for Pennsylvania Turnpike Commission, to Bethlehem Steel Co., Bethlehem, Pa., through B. Perini, Boston, contractor.
- 554 Tons, Bedford County, Pa., section 13-K, Pennsylvania Turnpike, to Bethlehem Steel Co., through N. R. Corbisello, contractor.
- 490 Tons, Cumberland County, Pa., bridge steel for Pennsylvania Turnpike Commission, to Bethlehem Steel Co.
- 475 Tons, Buffalo, N. Y., Pillsbury Flour Co. plant, to Buffalo Steel Co., Buffalo, through Jones-Hettelsater Construction Co., Kansas City, contractor.
- 420 Tons, Cumberland County, Pa., road main for Pennsylvania Turnpike Commission, to American Steel & Wire Co.
- 300 Tons, New Castle, Del., Cranston Heights viaduct, to Jones & Laughlin Steel Corp., Pittsburgh, through Taylor-Davis; J. A. Bader, contractor.
- 200 Tons, Accomac County, Va., five bridges, to Bethlehem Steel Co., through McLane Construction Co., contractor.
- 200 Tons, Chicago, garage, 12 E. Monroe St., to Inland Steel Co.
- 145 Tons, Franklin & Cumberland Counties, Pa., sections 18A and 18C, Pennsylvania Turnpike Commission, to Bethlehem Steel Co., through H. W. Shaul, Mechanicsburg, Pa.
- 130 Tons, Cleveland, Columbus Road bridge, to Carnegie-Illinois Steel Corp., Pittsburgh, through Western Foundation, general contractor.
- 100 Tons, Fulton County, Pa., section 10K, Pennsylvania Turnpike Commission, to Bethlehem Steel Co., through Dalton Brothers, Paoli, Pa., contractors.
- 100 Tons, Greenville, Me., state bridge to Bancroft & Martin Rolling Mill Co., Portland, Me.; Vulcan Construction Co., Boston, contractor.

CENTRAL AND WESTERN STATES

- 1231 Tons, Los Altos, Cal., cement silos, to Soile Steel Co., San Francisco.
- 300 Tons, Manitowoc, Wis., sewage treatment plant, to Bethlehem Steel Co.
- 119 Tons, Leavenworth, Wash., Bureau of Reclamation (Invitation A-38341-A), to Bethlehem Steel Co., San Francisco.
- 100 Tons, Caldwell, Idaho, Boise project (Invitation 21142-A), to Colorado Fuel and Iron Corp., Denver.

PENDING REINFORCING BAR PROJECTS

ATLANTIC STATES

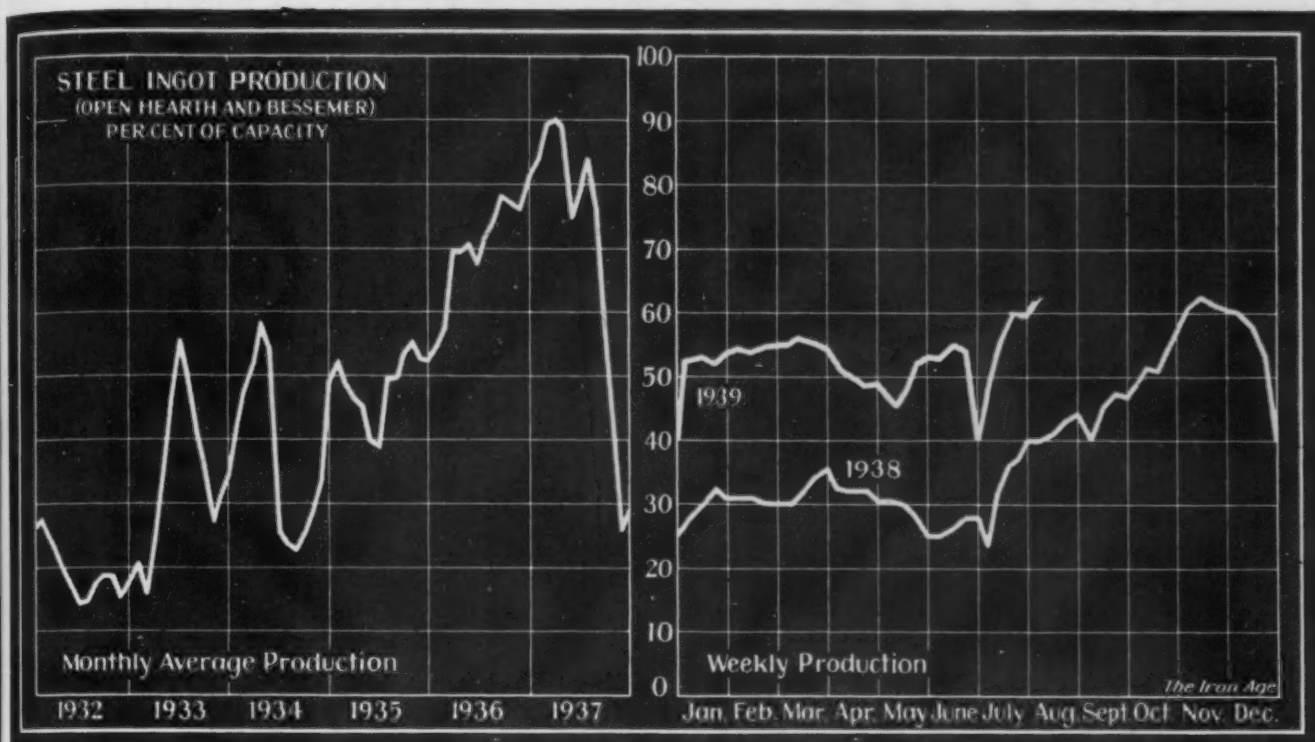
- 300 Tons, Burlington, N. J., Public Service Gas & Electric Co.
- 200 Tons, New York, office building for Aetna Life Insurance Co.
- 200 Tons, Fulton, N. Y., building for Peter Cailer Kohler Chocolate Co.
- 125 Tons, Barrington, R. I., state bridge, Frank Wescott Co., North Attleboro, Mass., contractor.
- 100 Tons, Pittsburg County, Okla., highway bridge, bids due Aug. 15.

CENTRAL AND WESTERN STATES

- 3750 Tons, Chicago, section S3 subway, new bids, Aug. 17, S. A. Healy original low bidder.
- 3010 Tons, Parker, Ariz., United States Indian Service (Invitation 538); bids Aug. 21.
- 255 Tons, Pearl Harbor, T. H., barracks (Specification 9156); bids Aug. 15.
- 250 Tons, Tell City, Ind., flood control.
- 172 Tons, Bramwell, Idaho, Boise project (Invitation 21148-A); bids Aug. 10.

AT LEFT—This massive No. 4 Davis rotary mill is used to machine the tops and bottoms of cylinder blocks at the Pontiac motor plant. It is one of the best examples of the pieces of "key" equipment in the automobile industry. Its weight (about 67,000 lbs.) and design provide the rigidity required for such a cutting job, but the mill is flexible enough to be used for a different size engine block, should that be necessary because of model change. In an industry which faces prospects of periodic basic redesign, such flexibility is invaluable. In this case, radius of the work circle can be changed, or blocks of different thickness accommodated when required.

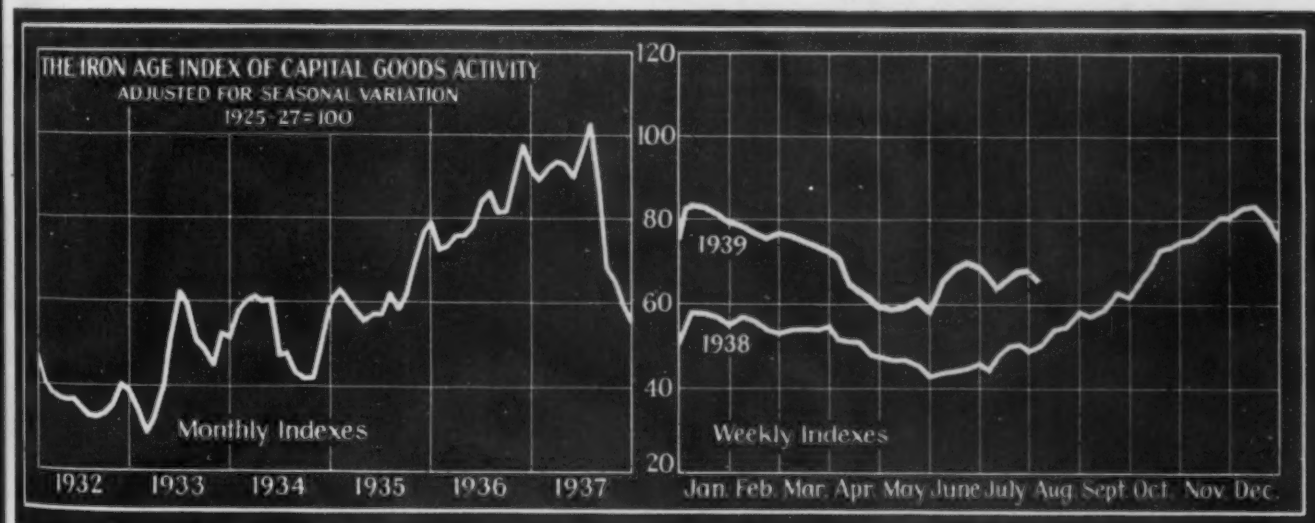
Ingot Production Rises One Point to 61%



District Ingot Production, Per Cent of Capacity	Pitts- burgh	Chicago	Valleys	Phila- delphia	Cleve- land	Buffalo	Wheel- ing	Detroit	Southern	S. Ohio River	Western	St. Louis	East- ern	Aggre- gate
CURRENT WEEK..	53.0	56.0	55.0	44.0	77.0	59.0	77.0	65.0	75.0	55.0	54.0	52.5	45.0	61.0
PREVIOUS WEEK..	51.0	56.0	55.0	42.0	70.0	59.0	77.0	62.0	82.0*	40.0	57.0	49.5	45.0	60.0

* Revised.

Capital Goods Index Turns Down Again After Brief Gain



AFTER gaining for three weeks following the holiday dip, THE IRON AGE index of capital goods activity made a rather sharp drop of 2.3 points to 64.8 for the week ended Aug. 5. A substantial gain was made in the combined Pittsburgh figure, representing gains in both production and shipments at that point, largely as a result of increasing steel mill activity. On a seasonally adjusted basis, originating freight shipments were the highest in any week this year. There was an increase in the steel ingot production factor also, when seasonally adjusted, although no change was recorded over the estimate of 60 per cent for the preceding week. Lumber carloadings were off only slightly, but suffered a larger loss in the index when seasonal corrections were applied.

Heavy engineering awards showed a gain of 13 per cent over the preceding week but a loss of 3.7 per cent on the 13-week moving average used in computing the index factor.

	Week Ended Aug. 5	Week Ended July 29	Comparable Week	
			1938	1929
Steel ingot production ¹	86.7	85.5	57.0	135.6
Automobile production ²	33.1	44.9	19.4	118.5
Construction contracts ³	65.8	67.7	65.3	125.1
Forest products carloadings ⁴	61.0	62.2	51.6	119.7
Production and shipments, Pittsburgh District ⁵	77.2	75.1*	52.0	129.8
Combined index	64.8	67.1	49.1	125.7

*Revised.

Sources: 1. THE IRON AGE; 2. Ward's Automotive Reports; 3. Engineering News-Record; 4. Association of American Railroads; 5. University of Pittsburgh.

... SUMMARY OF THE WEEK ...

... *Ingot production up at 61 per cent;
scrap at highest since 1937.*

o o o

... *Automobile releases expected to in-
crease this month.*

o o o

... *Six blast furnaces go in this month,
raising total to 135.*

ARISE in steel ingot production of one point to 61 per cent, highest since November, 1938, and a further gain in scrap prices which raises THE IRON AGE scrap price composite to \$15.42, highest since October, 1937, bear out expectations of a stronger trend for steel business during the late summer and early autumn.

The settlement of the General Motors strike has not yet had an important effect on steel releases by that company as preparation of dies for new models must precede the taking of steel in large tonnages, but specifications from General Motors in fairly large volume are expected before the end of this month.

Meanwhile, the adjournment of Congress, together with the defeat of the New Deal's spending-lending program, has had a good sentimental effect on business, notwithstanding the fact that a good share of present steel buying flows directly or indirectly from Government expenditures. If private spending by such important steel-consuming industries as the public utilities, oil companies and the railroads were to assume somewhat nearer normal proportions, the steel outlook for the remainder of this year would be well assured.

Oil and gas companies have taken more pipe line tonnage this year than since 1937, though only a few of the orders have been of spectacular size, but there is much to be desired so far as the public utilities and the railroads are concerned. However, several thousand railroad cars may be inquired for within the near future. Two inquiries of fair size have appeared within the past week, one from the Virginian Railway for 500 hopper cars, and the other a renewal of a previous inquiry by the Chicago & North Western for 800 cars. A Philadelphia company has orders on hand for a large volume of light-weight passenger cars, for which about 1250 tons of stainless steel has been purchased.

THE outstanding significance of current steel business is the great diversification of orders, both as to products and the range of industries

from which the orders come. As there is no indication of a cessation of this flow of miscellaneous business within the near future, the steel industry is hopeful of higher operating rates as soon as automobile tonnage is sufficient to make itself felt. Within a week or two the trend of automobile assemblies will be upward as production of new models begins.

While ingot production of the past week or two represents to some extent an anticipation of automobile releases, there is said to be no abnormal stocking of ingots, slabs, etc. A few plants are building up moderate stocks in preparation for a shut down of steel making departments for all or part of Labor Day week.

At Cleveland there has been a seven-point rise to 77 per cent this week, partly in preparation for automotive demand. The independent steel plant at Detroit will be operating at 87½ per cent by the end of the week, while the Ford plant, now operating six open-hearth furnaces, will have all 10 in service by Aug. 21. An operation of 100 per cent at Detroit is expected as soon as motor car companies get into full production.

Six blast furnaces have gone in since the first of the month, two Carnegie-Illinois and two Jones & Laughlin in the Pittsburgh district, and two Carnegie-Illinois in the Chicago district. These are in addition to a revised figure of 129 that were active on Aug. 1. Pig iron capacity was operated last month at 55.8 per cent of capacity compared with 54.50 per cent for steel ingot, suggesting the possibility of increased ratio of pig iron to scrap in open-hearth melting because of high scrap prices.

STEEL scrap is 25c. a ton higher at Pittsburgh to an average of \$16.125 and 50c. higher at Philadelphia, where it averages \$16.25, with no change at Chicago. Foreign business, particularly Japanese, is partly responsible for increased strength in the East.

Steel prices continue to strengthen, the latest move being an effort to put reinforcing bars, long one of the weakest items, on a better price basis. Several makers have announced new quotations of 1.90c. a lb., basing point, for billet steel bars and 1.80c. for rail steel bars, which are lower than the prices officially announced for this quarter but well above the prices that have become commonly quoted.

DESPITE some falling off in inquiries for fabricated structural steel, awards have been in fairly good volume at about 19,500 tons. About 25,000 tons of galvanized sheets will be required for corn cribs which the Government will have built for the corn belt.

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	Aug. 8, 1939	Aug. 1, 1939	July 11, 1939	Aug. 9, *1938
Rails, heavy, at mill	\$40.00	\$40.00	\$40.00	\$42.50
Light rails: Pittsburgh, Chicago, Birmingham	40.00	40.00	40.00	40.00
Rerolling billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	34.00
Sheet bars: Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point	34.00	34.00	34.00	34.00
Slabs: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	34.00
Forging billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham	40.00	40.00	40.00	40.00
Wire rods: Nos. 4 and 5, Pittsburgh, Chicago, Cleveland	43.00	43.00	43.00	43.00
Skelp, grvd. steel: Pittsburgh, Chicago, Youngstown, Coatesville, Sparrows Point, cents per lb.	1.90	1.90	1.90	1.90

Finished Steel

Cents Per Lb.:	Aug. 8, 1939	Aug. 1, 1939	July 11, 1939	Aug. 9, *1938
Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham	2.15	2.15	2.15	2.25
Plates: Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont	2.10	2.10	2.10	2.10
Structural shapes: Pittsburgh, Chicago, Gary, Buffalo, Bethlehem, Birmingham ..	2.10	2.10	2.10	2.10
Cold finished bars: Pittsburgh, Buffalo, Cleveland, Chicago, Gary	2.65	2.65	2.65	2.70
Alloy bars: Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton	2.70	2.70	2.70	2.80
Hot rolled strip: Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown, Birmingham	2.00	2.00	2.00	2.15
Cold rolled strip: Pittsburgh, Cleveland, Youngstown ..	2.80	2.80	2.80	2.95
Sheets, galv., No. 24: Pittsburgh, Gary, Sparrows Point, Buffalo, Middletown, Youngstown, Birmingham ..	3.50	3.50	3.50	3.50
Hot rolled sheets: Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown ..	2.00	2.00	2.00	2.15
Cold rolled sheets: Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown ..	3.05	3.05	3.05	3.20

Cents Per Lb.:

	Aug. 8, 1939	Aug. 1, 1939	July 11, 1939	Aug. 9, *1938
Wire nails: Pittsburgh, Chicago, Cleveland, Birmingham	2.40	2.40	2.40	2.45
Plain wire: Pittsburgh, Chicago, Cleveland, Birmingham	2.60	2.60	2.60	2.60
Barbed wire, galv.: Pittsburgh, Chicago, Cleveland, Birmingham	†3.25	3.25	3.25	3.20
Tin plate, 100 lb. base box: Pittsburgh and Gary	\$5.00	\$5.00	\$5.00	†\$5.35

*Pittsburgh prices only.

†Applies to 80-rod spools only.

‡Subject to post-season adjustment.

Pig Iron

Per Gross Ton:

No. 2 fdy., Philadelphia	\$22.84	\$22.84	\$22.84	\$21.84
No. 2, Valley furnace	21.00	21.00	21.00	20.00
No. 2, Southern Cin'ti	21.06	21.06	21.06	20.06
No. 2, Birmingham	17.38	17.38	17.38	16.38
No. 2, foundry, Chicago† ..	21.00	21.00	21.00	20.00
Basic, del'd eastern Pa.	22.34	22.34	22.34	21.34
Basic, Valley furnace	20.50	20.50	20.50	19.50
Malleable, Chicago†	21.00	21.00	21.00	20.00
Malleable, Valley	21.00	21.00	21.00	20.00
L. S. charcoal, Chicago	28.34	28.34	28.34	28.34
Ferromanganese, seab'd carlots	80.00	80.00	80.00	92.50

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:

Heavy melting steel, P'gh...†	\$15.125	\$15.875	\$15.50	\$15.50
Heavy melting steel, Phila...	14.25	15.75	15.50	14.75
Heavy melting steel, Ch'go...	13.875	13.875	13.375	14.25
Carwheels, Chicago	12.75	12.75	12.75	15.25
Carwheels, Philadelphia	14.25	16.00	16.00	17.25
No. 1 cast, Pittsburgh	15.25	15.25	15.25	15.25
No. 1 cast, Philadelphia	16.75	16.75	16.25	16.75
No. 1 cast, Ch'go (net ton)...	12.75	12.75	12.25	13.75

Coke, Connellsville

Per Net Ton at Oven:

Furnace coke, prompt	\$3.75	\$3.75	\$3.75	\$3.75
Foundry coke, prompt	4.75	4.75	4.75	4.75

Non-Ferrous Metals

Cents per Lb. to Large Buyers:

Copper, Electrolytic, Conn.†	\$10.50	\$10.31	\$10.00	\$10.125
Copper, Lake, New York...	10.50	10.375	10.00	10.25
Tin (Strait), New York...	48.80	48.45	48.80	43.70
Zinc, East St. Louis	4.75	4.60	4.50	4.75
Zinc, New York	5.14	4.99	4.89	5.14
Lead, St. Louis	4.90	4.70	4.70	4.75
Lead, New York	5.05	4.85	4.85	4.90
Antimony (Asiatic), N. Y.	14.00	14.00	14.00	14.00

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

The Iron Age Composite Prices

Finished Steel

Aug. 8, 1939
One week ago
One month ago
One year ago

2.236c. a Lb.
2.236
2.236
2.300

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

	High	Low
1939.....	2.286c., Jan. 3; 2.236c., May 16	
1938.....	2.512c., May 17; 2.211c., Oct. 18	
1937.....	2.512c., Mar. 9; 2.249c., Jan. 4	
1936.....	2.249c., Dec. 28; 2.016c., Mar. 10	
1935.....	2.062c., Oct. 1; 2.056c., Jan. 8	
1934.....	2.118c., Apr. 24; 1.945c., Jan. 2	
1933.....	1.953c., Oct. 3; 1.792c., May 2	
1932.....	1.915c., Sept. 6; 1.870c., Mar. 15	
1931.....	1.981c., Jan. 13; 1.883c., Dec. 23	
1930.....	2.192c., Jan. 7; 1.962c., Dec. 9	
1929.....	2.223c., Apr. 2; 2.192c., Oct. 29	
1928.....	2.192c., Dec. 11; 2.142c., July 10	

Pig Iron

\$20.61 a Gross Ton
20.61
20.61
19.61

Based on average for basic iron at Valley furnace and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

	High	Low
.....	\$23.25, June 21; \$19.61, July 6	
.....	23.25, Mar. 9; 20.25, Feb. 16	
.....	19.73, Nov. 24; 18.73, Aug. 11	
.....	18.84, Nov. 5; 17.83, May 14	
.....	17.90, May 1; 16.90, Jan. 27	
.....	16.90, Dec. 5; 13.56, Jan. 3	
.....	14.81, Jan. 5; 13.56, Dec. 6	
.....	15.90, Jan. 6; 14.79, Dec. 15	
.....	18.21, Jan. 7; 15.90, Dec. 16	
.....	18.71, May 14; 18.21, Dec. 17	
.....	18.59, Nov. 27; 17.04, July 24	

Steel Scrap

\$15.42 a Gross Ton
15.17
14.71
14.83

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	High	Low
.....	\$15.42, Aug. 8; \$14.08, May 16	
.....	15.00, Nov. 22; 11.00, June 7	
.....	21.92, Mar. 30; 12.92, Nov. 10	
.....	17.75, Dec. 21; 12.67, June 9	
.....	13.42, Dec. 10; 10.33, Apr. 29	
.....	13.00, Mar. 13; 9.50, Sept. 25	
.....	12.25, Aug. 2; 6.75, Jan. 3	
.....	8.50, Jan. 12; 6.43, July 5	
.....	11.33, Jan. 6; 8.50, Dec. 29	
.....	15.00, Feb. 18; 11.25, Dec. 9	
.....	17.58, Jan. 29; 14.08, Dec. 3	
.....	16.50, Dec. 31; 13.08, July 9	

THIS WEEK'S MARKET NEWS

NEW BUSINESS

*... Good diversification of orders
... Automobile releases expected
in larger volume soon*

THE general run of incoming business at PITTSBURGH continues highly diversified. Total orders in the past week were equally as heavy as in the previous week. Tin plate releases remain at a high level, while the volume of hot rolled bar, structural shape, and plate specifications has registered a mild improvement. Sheet makers expect heavier automotive releases before the end of this month.

Bookings and releases against commitments are increasing in the CHICAGO district. The backbone continues to be the miscellaneous group of consumers, but in the past two weeks orders against low priced sheets and strip have been received from all major automobile makers except General Motors. From now throughout the fall months, the motor car industry is expected to assume an increasing share of the total business being placed in that area. Sellers at the same time see no indication of a lessening in the widely diversified demand that has been so important over the past few months.

Tractor makers are busy introducing new models; high production is expected in this field in autumn. Present dealer stocks of farm implements are low, which fact, combined with the great interest being expressed in the new tractors, is giving agricultural machinery manufacturers cause for considerable optimism.

New bids are being asked Aug. 17 by the CHICAGO subway department on section S3, on which the S. A. Healy Co. was the original low bidder. This section includes 1950 tons of shapes, about 28,000 tons of liner plates and rib beams, 3750 tons of reinforcing bars, 540 tons of sheet piling and 395 tons of cast iron.

The Illinois Manufacturers Association's figures reveal that for the first five months of 1939 refrigerator sales were 40 per cent ahead of the same period in 1938, electric water heaters, 46 per cent ahead; stokers, 6 per cent ahead; and electric washing machines 36½ per cent ahead. Steel consumption by the home appliance industry has been one of the highlights of the miscellaneous demand.

Although bookings in CLEVELAND in the past week were off slightly from

the preceding week, a loss so small as to have no significance, the settling of the General Motors strike has given rise to considerable optimism and is looked upon as assurance that August business will show a further gain over the July level. In July steel business was bereft of important automobile aid yet was able to support local operations at around 70 per cent. With automobile business, it is expected that operations will move higher, particularly since no decrease in miscellaneous demand is in evidence. It is quite likely, however, that it will be two weeks before large shipments to G. M. units and their parts suppliers will begin, as there remains a certain amount of die work to be completed and try-outs must be run off before production on 1940 cars is started in earnest.

Business in the ST. LOUIS area is on the upturn. Some new business is being placed, and requests for shipments against orders placed during the short-lived lower-priced era of May and June have been greatly increased.

STEEL OPERATIONS

*... Rate for country up one point
to 61% ... Outlook encouraging*

STEEL ingot production is higher this week in several districts, the rate for the industry being estimated by THE IRON AGE at 61 per cent, one point higher than last week. In CLEVELAND operations have gained seven points over last week to 77 per cent, which is the highest rate since the fall of 1938. While the rate in DETROIT was unchanged at the beginning of the week, it was expected that the Great Lakes Steel Corp., which now has 10 open hearth furnaces in operation, would put on four more on Thursday or Friday, bringing its rate up to 87½ per cent, while the Ford Motor Co., now operating six of its ten furnaces, will have all of them in service by Aug. 21. By early fall it is expected that the Detroit rate will be 100 per cent.

The PITTSBURGH rate has risen two points this week to 53 per cent. At CHICAGO four mills stepped up operations sufficiently to balance the loss caused by the shutdown of the local plant of the Youngstown Sheet & Tube Co., where a new blooming mill is being installed. The district rate thus remains at 56 per cent.

In SOUTHERN OHIO the rate has increased sharply to 58 per cent owing

to resumption of steel making at the Middletown plant of the American Rolling Mill Co.

The only loss of importance is in the South, where steel making is lower because of the completion of a run on rails at the Ensley mill of the Tennessee Coal, Iron & Railroad Co.

Blast furnace operations are increasing along with steel. Two blast furnaces in the CHICAGO district (Carnegie-Illinois) have gone in and two in the PITTSBURGH district (both J. & L.).

PRICES

... Effort made to strengthen reinforcing bars

SEVERAL makers of new billet reinforcing bars have established a price to the trade of 1.90c. a lb. at principal basing points, while rail steel reinforcing bars are being quoted at 1.80c. a lb. The quotation on new billet reinforcing bars, although \$3 a ton less than the announced price for this quarter, is in reality an upward adjustment because most large projects recently have gone at less than 1.90c. a lb. base.

The steel price structure continues to show further signs of firming up and additional customers whose May commitments on sheets and strip have been used up have found it impossible to add to these low priced contracts.

Prices on bars, plates and sheets are firm in the CHICAGO territory. Weakness is prevalent only on fabricated shapes, reinforcing bars and some wire products. Galvanized sheets have been sold at the base price in the past week.

PIG IRON

... Strike settlement aids business; sellers optimistic for fall

OPTIMISM is felt toward fall business at some points, an important factor being a gradual production increase at automobile parts plants as a result of settlement of the General Motors Corp. strike.

New business, so far in August, is running ahead of July at CHICAGO, where sellers are estimating the current month's increase at 10 per cent, and in the NEW YORK area where foundry stocks continue low and both contract and spot business has increased. In the CLEVELAND district new business is reported to be moving

sidewise, with sellers pushing hard to get the remaining small amount of low-priced iron off their books.

Meanwhile sales and shipments in the PITTSBURGH area have changed but little from a week ago, with iron output at integrated steel companies increasing because of higher ingot production. Jones & Laughlin Steel Corp. late last week blew in two additional stacks at its Pittsburgh works.

Suppliers in EASTERN PENNSYLVANIA report July deliveries slightly above June with a slight improvement looked for in August. Some jobbing foundries have shown improvement, pipe foundries are working at a good rate and hardware foundries report some betterment in orders. There are occasional reports of shading in prices, but the market as a whole is firm at quoted levels, supported by the increases in foundry scrap.

The SOUTHERN OHIO pig iron market continues to be definitely sluggish although melters continue to accept iron on contract at the level established early in the current quarter. Foundry operations remain unchanged. Furnace representatives at BOSTON report buying is almost exclusively in carlots. Stocks in large consumers' hands are ample for this quarter's requirements and some will not need to buy iron until late in the fourth quarter unless business improves. The New England melt the past week averaged about the same as during the preceding week.

Shipments of pig iron to melters in St. LOUIS area for July were estimated to be between 15 and 20 per cent ahead of June, the gains being made in the last half of the month. Melters are showing a tendency to buy ahead whereas hand-to-mouth buying has prevailed recently.

Notwithstanding the sale of the properties of the Chateaugay Ore & Iron Co. to the Republic Steel Corp., the use of Standish, N. Y., as a basing point for low phosphorus pig iron will continue until the stock of iron on the ground at Standish is disposed of.

SEMI-FINISHED STEEL

... *Greater activity at non-integrated mills aids orders*

THE volume of fresh orders at PITTSBURGH increased moderately from a week ago and daily tonnages are holding up exceptionally well. Improvement reflects greater activity at non-integrated sheet plants. A slow upward trend in aggregate business is

expected to continue over the next several months because of the large amount of sheet and strip tonnage which will be released for shipment before the end of the first quarter.

SHIPBUILDING

... *Consolidated Steel Corp. may be awarded four boats*

THE Maritime Commission last week tentatively accepted the low bid of \$1,890,000 each for the construction of four steel cargo ships of the C-1 design by the Consolidated Steel Corp., Ltd., Los Angeles. To require a total of 10,600 tons of steel, the ships will be single screw, full scantling type, and steam propelled. Delivery will be made about 15 months after signing the contract. The commission said that formal award will not be made until it has disposed of the low bid submitted by the Tampa (Fla.) Shipbuilding & Engineering Co. It would not elaborate on the technicality delaying the formal award.

The Navy Department has awarded a \$1,498,886 contract to Fairbanks Morse & Co., Chicago, for two complete sets of propulsion machinery for two seaplane tenders under construction at the Puget Sound Navy Yard, Bremerton, Wash.

REINFORCING BARS

... *Price of 1.90c. on billet stock and 1.80c. on rail material announced*

SEVERAL steel producers have notified their distributors that reinforcing bars are to be sold to the trade at basing point quotations of 1.90c. per lb. for billet stock and 1.80c. for rail material. The new quotations are below the prices that were officially announced for this quarter, but are considerably above the prices which have actually been quoted on most of the larger jobs recently.

These new prices do not make provision for an allowance to distributors, which may be taken care of in a manner not yet been fully determined. The new quotations were put into effect immediately by some companies, while others gave their customers up to Aug. 10 to complete outstanding negotiations.

One of the largest jobs of the week was 1231 tons for silos at a cement

plant near Los Altos, Cal., which was awarded to the Soule Steel Co. Bethlehem Steel Co. has been awarded 730 tons for a Tuscarora Mountain tunnel on the Pennsylvania Turnpike, and 554 tons for section 13-E of the Pennsylvania Turnpike in Bedford County.

Substantial tonnages of concrete bars are pending, among which are 2000 tons for a housing project for colored people in Chicago, 3010 tons for the United States Indian Service at Parker, Ariz., on which bids will close Aug. 31, and 1337 tons for the Central Valley project in California, on which bids were closed Aug. 8. New bids will be taken Aug. 17 on section S 3 of the Chicago subway involving 3750 tons.

RAILROAD BUYING

... *Virginian Railway inquires for 500 55-ton hopper cars*

THE Virginian Railway has issued an inquiry for 500 hopper cars of 55-ton capacity. The Chicago & North Western has renewed its inquiry for 500 hopper and 300 box cars originally issued in the spring. The Virginian cars will take about 7000 tons of steel and the North Western cars about 9000 tons. Several thousand new freight cars are in the offing and may turn into the inquiry stage within the near future.

The New York, Chicago & St. Louis has ordered 10 gondola type container cars from the Pullman-Standard Car & Mfg. Corp. The New York, New Haven & Hartford is inquiring for 25 caboose cars.

The Great Northern Railway recently purchased about 5500 tons of rails from the Carnegie-Illinois Steel Corp., which has also received an order for 1000 tons of rails from the Monongahela Railway Co.

The Edward G. Budd Mfg. Co., Philadelphia, has on hand a substantial volume of business, some of which has been received within the past week, for stainless steel trains. These orders include two seven-car trains for the Florida East Coast Lines, two seven-car trains for the Atlantic Coast Line, two seven-car trains for the Seaboard Air Line, four stainless steel cars for the Pennsylvania, four cars for the Santa Fe and three for the Seaboard. This equipment will require about 2,500,000 lb. of stainless steel sheets and strip, orders for which have been divided among three makers.

The Bureau of Reclamation has read-

vertised for bids to be opened Aug. 18 (Invitation 33282-A1) for 2253 tons of relaying rails and 250 tons of new track accessories. The used rails are as follows: 533 tons of 90-lb. Class A, 1191 tons of 110-lb. Class A and 529 tons of 90-lb. Class B (guard rails). The bureau has apparently accepted bids which they opened July 24 for 3412 tons of new rails and a substantial quantity of track materials (Invitation 33284-A), but no disposition has been announced. Both lists are in connection with the relocation of the Southern Pacific Railroad tracks around Shasta Dam, Central Valley project, Cal.

The Panama Canal has invited bids on Aug. 22 for 10 steam or diesel locomotives of 5-ft. gage. Manufacturers have been invited to submit their own designs and specifications.

A Federal district court in Jacksonville, Fla., has upheld the action of receivers of the Florida East Coast Railway Co., on an order placed with the Electro-Motive Corp., and E. G. Budd Mfg. Co., for two streamlined trains on a joint bid of \$31,379,000. The American Car & Foundry Co. and the American Locomotive Co., had submitted a \$1,250,000 bid. Application for the purchase has not been filed with the Interstate Commerce Commission.

SHEETS AND STRIP

... Outlook is promising for upward trend in releases

THERE has been no let-up in the volume of incoming sheet and strip specifications at PITTSBURGH in the past week. Aggregate demand remains exceptionally well diversified and orders are for prompt shipment. Automotive releases have increased moderately with substantial improvement expected to be on its way before the end of this month. Producers anticipate an exceptionally active period in the next few months at least.

The Department of Agriculture, Washington, will probably place orders shortly for 25,000 corn cribs for the corn belt which will require about 25,000 tons of 24 to 24 gage galvanized sheets. Supplemental lettings may call for 10,000 or 15,000 additional bins.

Releases from the motor car industry are coming in to CHICAGO mills fairly well at present, but miscellaneous buying of steel products is still mainly responsible for the current operating rate. Not much actual new

business is expected until after Sept. 30, when shipments of low priced tonnage to non-automotive buyers may be completed. Talk of a 4,000,000 car-year has been heard here, and sheet mills are anticipating good demand for 1940 model specifications through the fall months at least. Jobbers and fabricators are ordering galvanized sheets at 3.50c. Some good sheet tonnages were bought last week by the Rock Island Arsenal.

Demand in CLEVELAND in the past week was slightly below the previous week's volume. It is felt, however, that this reversal will be only temporary, as the growing volume of new business being placed at full market prices is taken as an indication that consumers' activity is at a better rate than was originally expected. It will probably be 10 days to two weeks before any large scale automotive releases are made by the General Motors Corp. as there is still some die work to be done in addition to the usual tryouts before the real production work on 1940 models begins.

In the PHILADELPHIA territory the volume of releases so far this month is running only slightly above those of a month ago, but most sellers are confidently looking forward to a spurt in releases and new orders before the end of the month. Particularly helpful to this district has been the autobody stamping plants, which have experienced recurring calls for additional runs on 1939 model cars. This unexpected business has been coming in while the plants are working on new dies for 1940 models. Trial die runs have already started on Plymouth and Dodge, and trials on Chrysler are scheduled for next week. New Chevrolet frames will go into production on Aug. 15, and Ford is demanding trials not long thereafter, although for the latter the work is being seriously interfered with by the additional orders for 1939 bodies. The Budd company has received a tremendous volume of new train business over the past fortnight, including six seven-car trains and 11 additional cars. More than 2,500,000 lb. of 18-8 stainless steel strip and sheets have been purchased for constructing these trains.

St. LOUIS jobbers are taking in quantities ordered during the cut in prices in May, specifications being much heavier than for some time, largely because of a realization that prices might advance.

Shipments of sheets to users in the New YORK district were much heavier in July than in June and the rate is expected to be maintained in August.

based on the volume of specifications received in recent weeks. One of the leading sellers estimates that about 50 per cent of specifications on the low priced tonnages are now in. Another seller is attempting to get in all specifications by Aug. 15. Some of the smaller mills have fairly well cleaned up old orders.

COLD FINISHED BARS

... Increased demand expected soon from automobile makers

NEW business in the past week was about on a par with a week ago. A step-up in fresh orders as well as shipments is expected as soon as automobile makers increase production on new models. Miscellaneous demand shows little change. As yet no producer of cold finished bars has made any change in either extras or base price for fourth quarter delivery.

WIRE PRODUCTS

... Business is fairly good ... Little automotive buying

INDUSTRIAL sales of wire are holding up very well in the CHICAGO district and should remain good throughout the fall. Merchant wire is tapering off somewhat seasonally, but may pick up about Sept. 15. CHICAGO suppliers of the automobile industry have not yet released specifications for 1940 cars.

Rural demand is surprisingly active in CLEVELAND considering that this season is normally the year's low point on sales of this type. Manufacturers' requirements are unchanged from recent levels, although several plants have indicated that increased schedules will be in effect shortly. Nail buying is extremely small as many jobbers covered previous to Aug. 1, when the new extras became effective. It will probably be at least six weeks before nail buying in any volume may be expected.

Merchant wire specifications at PITTSBURGH have slowed up recently because many consumers placed business previous to Aug. 1 when wire nail revisions went into effect. Shipments are fair but no substantial volume of new orders is expected much before Sept. 1. Demand for manufacturers' wire, while not heavy, has improved from a week ago with further increases expected soon because of automotive requirements.

STRUCTURAL STEEL

... Specifications up at Pittsburgh; outlook brighter

SPECIFICATIONS are up 8 per cent from last week at PITTSBURGH where producers anticipate further improvement in the next few weeks. American Bridge Co. has booked 1000 tons of material for the Paedergat basin bridge, MS-39.3, Brooklyn; 1250 tons for an Aetna Life Insurance Co. building, New York, and 900 tons for the Raccoon Creek bridge, Bridgeport, N. J.

Building in the CHICAGO area continues moderately active, the largest award the past week being 2337 tons for power transmission towers given to Blaw-Knox Co., Pittsburgh. Several thousand tons are pending for three sections of the CHICAGO subway on which bids will be taken this month. Although inquiries are not numerous, total awards the past week in EASTERN PENNSYLVANIA exceeded 3500 tons.

The Bureau of Reclamation has announced that bids for the Pit River Bridge, required for highway and railroad relocation near Shasta Dam, Cal., and involving about 15,000 tons of shapes, will be taken this fall.

PLATES

... American Bridge Co. receives Grand Coulee award

GENERAL plate demand in CLEVELAND continues in fair volume. Railroad inquiry was in noticeably better volume in the past week with an inquiry from the Chesapeake & Ohio for repair parts involving 900 tons of plates and shapes outstanding. It has been decided to make the intake line of the Toledo Water Works project of

concrete. Had it been made of steel close to 6000 tons of plates would have been required.

Plate business in the NEW YORK area is still running light. The only sizable tonnage in sight is about 600 tons involved in the Lackawack dam project on which bids will be asked shortly.

The Bureau of Reclamation has awarded 11 drum gates for the Grand Coulee Dam, Washington, estimated to contain more than 6000 tons of shapes and plates, to American Bridge Co., Pittsburgh.

Anheuser-Busch, Inc., St. Louis, has plans in progress for building a fermenting and storage cellar of brick and concrete, five stories, 50,000-barrel capacity to cost about \$750,000. Bosari Tank Corp., of America, 60 East 42nd Street, New York, are architects.

MERCHANT BARS

... Sales increasing ... Navy buys 1750 tons for battleships

CONTRACTS for 1550 tons of black and 200 tons of galvanized bar steel to cost a total of \$86,407.50 have been awarded by the Navy Department for the two 45,000-ton battleships under construction at the Brooklyn and Philadelphia Navy yards. The steel ordered, which is to be divided equally between the two yards, will be supplied by these companies: Inland Steel Co., Chicago, 1500 tons of black bar steel to cost \$74,400; Thomas Gregory Galvanizing Works, Maspeth, L. I., 200 tons, galvanized, \$9,480; Carnegie-Illinois Steel Corp., Pittsburgh, 25 tons, black, \$1,287.50; Bethlehem Steel Co., Bethlehem, Pa., 25 tons, black, \$1,240.

With wide diversification both as to

size and type of consumption bar sales at PITTSBURGH continue to expand. Order volume last week was close to 20 per cent in excess of business placed the week before. Miscellaneous demand remains strong and additional support is expected soon from automotive centers. Reflecting relatively low consumers' stocks, current specifications are for prompt delivery.

Prospects for CHICAGO bar sellers are improving. Specifications for 1940 automobile models are beginning to come in, and are expected to continue through October and November. Farm equipment operations probably will increase in September and October because of low dealer stocks and an anticipated rise in consumer demand.

TUBULAR GOODS

... Pipe line business has been good this year ... More in sight

TOTAL sales of tubular products at PITTSBURGH gained slightly in the past week compared with the week before, with increases noted in oil-country goods and standard pipe specifications. Aggregate line pipe business placed so far this year is substantially ahead of the volume placed during the corresponding period last year. While there has been no large number of outstanding pipe lines, the major portion of this improvement reflects a sharp increase of gathering pipe lines and miscellaneous requirements, many of which range from 10 to 60 miles in length.

Pipe demand in CLEVELAND is holding up well with standard pipe sales relatively better than oil country items. It is understood that there are a number of large pipe line projects under consideration in the West on which formal bids have not yet been issued.

Weekly Bookings of Construction Steel

	Week Ended				Year to Date	
	Aug. 8, 1939	Aug. 1, 1939	July 11, 1939	Aug. 9, 1938	1939	1938
Fabricated structural steel awards	19,505	25,150	7,950	17,350	625,380	426,525
Fabricated plate awards	8,050	4,130	625	4,485	107,385	84,870
Steel sheet piling awards	700	270	6,810	0	43,025	28,310
Reinforcing bar awards	5,395	8,450	6,575	19,830	296,095	183,855
Total Letting of Construction Steel ..	33,650	38,000	21,960	42,665	1,071,885	724,560

IRON AND STEEL SCRAP

AUG. 8—Restriction of material flowing into yards and broker competition for the available supply has sent prices up on steel melting grades 50c. at Philadelphia and has improved the average price 25c. on No. 1 heavy melting steel at Pittsburgh. Offers of \$14 are bringing material out freely at Chicago, but there is no money in it for brokers as \$14 represents the last important mill sale. There is no change in the quotation for No. 1 at Chicago this week, but with the other advances noted, *THE IRON AGE* composite has advanced 25c., from \$15.17 to \$15.42, new high for the year and the highest level since Oct. 19, 1937. The average peaked at \$15 in 1938.

There have been important sales of blast furnace material at Pittsburgh and Cleveland, but there have been no large sales of heavy melting grades at the latter point, nor at Youngstown in recent weeks. A Buffalo consumer bought 6000 tons of No. 2 steel at quoted prices. Railroad lists have all commanded higher prices than a month ago. Short interests among dealers are paying higher prices at St. Louis, following recent sales into consumption.

Domestic competition in Eastern Pennsylvania has slowed the flow of export material to Port Richmond, and the new price level will practically eliminate this territory as a source of supply for the time being. New York brokers have advanced buying prices for export as loadings increase and following Japanese sales at higher prices than before.

Pittsburgh

Further strength has appeared in the market during the past week owing to unusually keen competition between brokers for available supplies of scrap which are not plentiful. About a week ago, odd cars of No. 1 heavy melting were being picked up at \$15.50 and \$15.75 but now, with the exception of an occasional car, brokers are freely paying \$16 a ton for No. 1 heavy melting steel. Some consuming points within the district are paying at least \$16.25 and in some cases higher for No. 1 steel. Because of this unusual situation No. 1 heavy melting steel this week is quoted within a 25c. range of \$16 to \$16.25 a ton, up 25c. a ton from last week's average price. Railroad heavy melting steel has advanced 25c. a ton, being quoted at \$16.75 to \$17.25 on the basis of recent sales into consumption. It is understood the Pennsylvania list went for an average of slightly over \$16.75 for heavy melting steel. The B. & O. heavy melting is reported to have brought \$16.50. The P. & L. E. list brought about \$15.90 a ton for No. 1 steel and because of freight rate and brokerage fee, will prob-

ably bring close to \$17 delivered to the consumer. Mixed borings and turnings and cast iron borings are up 75c. a ton this week on top range on the basis of a 4000-ton purchase of high grade material at \$9.75 a ton.

Chicago

This market continues strong with brokers buying steel from \$13.75 to \$14, the latter figure bringing material out freely. A small tonnage was sold last week to Youngstown's local plant for \$14.50 with shipment deferred until next month since the open-hearth units are shut down while a new bloomer is being installed. This sale is not regarded as important, as the leading buyer made a purchase soon thereafter for \$14 and also because of the length of time over which shipments will extend. The Rock Island list brought \$14.84 gross delivered Chicago last week, while the Northwestern sold within a range of \$14.56 and \$15.12. The Burlington refused to sell its accumulation for less than \$15.40 a gross ton.

Philadelphia

A combination of heavier demands for scrap and restriction in amount of material flowing into yards for processing has resulted in price advances for all important grades. Several mills purchased moderate amounts of No. 1 steel last week at \$16.50, delivered, and most cast grades and some of the specialties are 50c. higher as a reflection of recent modest sales. No rise has taken place in offerings for export, the result being that deliveries of material to Port Richmond have tapered considerably. E. G. Budd's list of compressed bundles for August delivery, amounting to 2000 tons, was bid in last week by a broker, at an estimated price of 50c. above the level ruling a month earlier.

Cleveland

Within the past week a nearby consumer purchased 4000 tons of cast iron borings and mixed borings and turnings at \$9 a ton delivered. This price includes the additional freight from Cleveland area. Quotations on these items have correspondingly been advanced 25c. a ton. Outside of this sale the market is unchanged from a week ago. There has been no buying of prime melting grades in some time and current activity centers around broker covering. All grades of material are now relatively plentiful. A part of the last New York Central list was sold to a nearby consumer on the road's own tracks at \$15.50 delivered.

Youngstown

There have been no new mill sales lately as most consumers in this district are covered well forward, one large user having sufficient commitments to carry well through September at present rate of operations. Current prices are receiving considerable support from broker-dealer sales, some having been made in the past week at as high as \$14.50 on No. 2 steel.

Buffalo

A large consumer in the district this week placed an order for 6000 tons of

No. 2 heavy melting steel at quoted prices. At the same time shipments were readmitted after a brief suspension. No weakening tendencies have been noted in the market and spirit is good. No further activity in cast grades has been reported.

Cincinnati

The old materials market continues to present a strong appearance, although advance of dealers' bids has been halted for the time being. Mill purchasing is not extensive, but small sales here and there are reported and movement against old contract continues at good rate.

St. Louis

Because of a short interest in scrap iron as a result of the sale reported in last week's issue, dealers are paying higher prices for material. Receipts from the country have been light and stocks in dealers' yards are reported to be low. Nos. 1 and 2 heavy melting, cast iron car wheels and railroad malleable are 25c. a ton higher; No. 2 railroad wrought 50c. up and miscellaneous standard section rails are \$1 higher. Railroad lists: Wabash, 3000 tons; Missouri Pacific, 1300 tons; Missouri-Kansas-Texas, 1100 tons; Ann Arbor, 225 tons, and St. Louis Southwestern, 250 tons.

Detroit

Having reached a leveling off place, at least temporarily, scrap prices in the Detroit area in the last week have remained steady. Automotive lists brought prices in line with *THE IRON AGE* quotations and accumulations were moved without difficulty.

New York

With a stronger market in Philadelphia, brokers have increased their buying prices for Nos. 1 and 2 steel, heavy breakable cast and clean steel turnings, on cars for domestic delivery. Recent Japanese business at an advance of 50c. a ton over the last sale, plus the arrival of several vessels for loading for both Oriental and European ports, has strengthened the export market, and for the first time this year buying prices have been advanced on Nos. 1 and 2 heavy melting steel. Cast grades are unaffected. Further Japanese buying is expected in the near future.

Toronto

Iron and steel scrap markets showed no change during the week. Prices held steady, with demand slow and specialized. Offerings to dealers continue limited but sufficient supplies are reaching yards to take care of current demands.

Boston

Prices generally for domestic delivery are firmer, those for breakable cast, steel turnings and shafting showing the greatest strength. Firmer prices have brought a slight betterment in shipments, especially in Pennsylvania consuming points. Mixed borings and turnings are moving at \$5 a ton delivered New England. Tonnage involved is comparatively small, however. Foundries are buying textile and machinery cast in small lots at former prices.

Export market continues active, strong and unchanged in price. Boston's June exports approximated 32,000 tons, heaviest for any month in two years.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mtng. steel.	\$16.00 to \$16.25
Railroad hvy. mtng.	16.75 to 17.25
No. 2 hvy. mtng. steel.	14.00 to 14.50
Scrap rails	16.50 to 17.00
Rails 3 ft. and under.	18.00 to 18.50
Comp. sheet steel	16.00 to 16.25
Hand bundled sheets	15.00 to 15.25
Hvy. steel axle turn.	14.25 to 14.75
Machine shop turn.	9.50 to 10.00
Short shov. turn.	10.50 to 11.00
Mixed bor. & turn.	9.00 to 9.75
Cast iron borings	9.00 to 9.75
Cast iron carwheels	15.00 to 15.50
Hvy. breakable cast.	12.50 to 13.00
No. 1 cupola cast.	15.00 to 15.50
RR. knuckles & cplrs.	18.00 to 18.50
Rail coil & leaf springs	18.50 to 19.00
Rolled steel wheels	18.50 to 19.00
Low phos. billet crops	19.00 to 19.50
Low phos. punchings	18.00 to 18.50
Low phos. plate	16.50 to 17.50

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mtng. steel.	\$16.00 to \$16.50
No. 2 hvy. mtng. steel.	14.00 to 14.50
Hydraulic bund., new	16.00 to 16.50
Hydraulic bund., old	12.50 to 13.00
Steel rails for rolling	17.00 to 17.50
Cast iron carwheels	16.00 to 16.50
Hvy. breakable cast.	16.00
No. 1 cast	16.50 to 17.00
Stove plate (steel wks.)	13.00 to 13.50
Railroad malleable	16.00 to 17.00
Machine shop turn.	9.00 to 9.50
No. 1 blast furnace	6.50 to 7.00
Cast borings	6.50 to 7.00
Heavy axle turnings	10.50 to 11.00
No. 1 low phos. hvy.	17.50 to 18.00
Couplers & knuckles	17.50 to 18.00
Rolled steel wheels	17.50 to 18.00
Steel axles	20.00 to 20.50
Shafting	20.50 to 21.00
Spec. iron & steel pipe	13.00 to 13.50
No. 1 forge fire	12.00 to 12.50
Cast boring (chem.)	9.50 to 10.00

CHICAGO

Delivered to Chicago district consumers:

Per Gross Ton	
Hvy. mtng. steel	\$13.75 to \$14.00
Auto. hvy. mtng. steel alloy free	12.50 to 13.00
No. 2 auto steel	11.00 to 11.50
Shoveling steel	13.75 to 14.00
Factory bundles	12.75 to 13.25
Dealers' bundles	11.75 to 12.25
Drop forge flashings	10.00 to 10.50
No. 1 busheling	12.50 to 13.00
No. 2 busheling, old	5.75 to 6.25
Rolled carwheels	14.50 to 15.00
Railroad tires, cut	15.00 to 15.50
Railroad leaf springs	14.50 to 15.00
Steel coup. & knuckles	14.50 to 15.00
Axle turnings	12.50 to 13.00
Coil springs	16.50 to 17.00
Axle turn. (elec.)	13.50 to 14.00
Low phos. punchings	15.50 to 16.00
Low phos. plates 12 in. and under	15.00 to 15.50
Cast iron borings	6.50 to 7.00
Short shov. turn.	6.50 to 7.00
Machine shop turn.	6.50 to 7.00
Rerolling rails	18.00 to 18.50
Steel rails under 3 ft.	16.00 to 16.50
Steel rails under 2 ft.	16.50 to 17.00
Angle bars, steel	15.50 to 16.00
Cast iron carwheels	12.50 to 13.00
Railroad malleable	15.00 to 15.50
Agric. malleable	12.00 to 12.50

Per Net Ton

Iron car axles	\$18.00 to \$18.50
Steel car axles	17.50 to 18.00
Locomotive tires	13.00 to 13.50
Pipes and flues	8.50 to 9.00
No. 1 machinery cast.	12.00 to 12.50
Clean auto. cast	12.50 to 13.00
No. 1 railroad cast.	11.00 to 11.50
No. 1 agric. cast	10.00 to 10.50
Stove plate	7.75 to 8.25
Grate bars	7.75 to 8.25
Brake shoes	9.50 to 10.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mtng. steel.	\$15.25 to \$15.75
No. 2 hvy. mtng. steel.	14.25 to 14.75
Low phos. plate	16.50 to 17.00
No. 1 busheling	14.25 to 14.75
Hydraulic bundles	14.75 to 15.25
Machine shop turn.	9.00 to 9.50

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mtng. steel.	\$14.50 to \$15.00
No. 2 hvy. mtng. steel.	13.50 to 14.00
Comp. sheet steel	14.25 to 14.75
Light bund. stampings	11.00 to 11.50
Drop forge flashings	11.50 to 12.00
Machine shop turn.	7.50 to 8.00
Short shov. turn.	8.00 to 8.50
No. 1 busheling	13.50 to 14.00
Steel axle turnings	10.50 to 11.00
Low phos. billet and bloom crops	18.50 to 19.00
Cast iron borings	8.25 to 8.75
Mixed bor. & turn.	8.25 to 8.75
No. 2 busheling	8.50 to 8.75
No. 1 cupola cast	15.50 to 16.00
Railroad grate bars	11.00 to 11.50
Stove plate	9.00 to 9.50
Rails under 3 ft.	17.75 to 18.25
Rails for rolling	18.25 to 18.75
Railroad malleable	15.50 to 16.00
Cast iron carwheels	14.00 to 14.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. mtng. steel.	\$14.50 to \$15.00
No. 2 hvy. mtng. steel.	12.50 to 13.00
Scrap rails	15.50 to 16.00
New hvy. b'ndled sheets	13.00 to 13.50
Old hydraul. bundles	11.50 to 12.00
Drop forge flashings	12.50 to 13.00
No. 1 busheling	12.50 to 13.00
Machine shop turn.	6.00 to 6.50
Knuckles & couplers	15.00 to 15.50
Coil & leaf springs	15.00 to 15.50
Rolled steel wheels	15.00 to 15.50
Shov. turnings	7.00 to 7.50
Mixed bor. & turn.	7.00 to 7.50
Cast iron borings	7.00 to 7.50
No. 1 machinery cast.	15.00 to 16.00
No. 1 cupola cast.	14.50 to 15.00
Stove plate	13.00 to 13.50
Steel rails under 3 ft.	18.00 to 18.50
Cast iron carwheels	13.50 to 14.00
Railroad malleable	15.00 to 15.50

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting	\$12.00 to \$12.50
No. 1 hvy. melting	11.75 to 12.25
No. 2 hvy. melting	11.25 to 11.75
No. 1 locomotive tires	12.25 to 12.75
Misc. stand. sec. rails	14.00 to 14.50
Railroad springs	14.00 to 14.50
Bundled sheets	7.00 to 7.50
No. 1 busheling	7.50 to 8.00
Cast. bor. & turn.	2.50 to 3.00
Machine shop turn.	4.50 to 5.00
Heavy turnings	9.00 to 9.50
Rails for rolling	16.00 to 16.50
Steel car axles	17.00 to 17.50
No. 1 RR. wrought	9.75 to 10.25
No. 2 RR. wrought	12.00 to 12.50
Steel rails under 3 ft.	16.00 to 16.50
Steel angle bars	13.00 to 13.50
Cast iron carwheels	14.75 to 15.25
No. 1 machinery cast.	14.50 to 15.00
Railroad malleable	12.00 to 12.50
No. 1 railroad cast.	12.50 to 13.00
Stove plate	7.50 to 8.00
Grate bars	8.50 to 9.00
Brake shoes	9.50 to 10.00

CINCINNATI

Dealers' buying prices per gross ton at yards:

No. 1 hvy. mtng. steel.	\$11.50 to \$12.00
No. 2 hvy. mtng. steel.	9.25 to 9.75
Scrap rails for mtng.	15.00 to 15.50
Loose sheet clippings	7.00 to 7.50
Hydrau. b'ndled sheets	11.00 to 11.50
Cast iron borings	3.50 to 4.00
Machine shop turn.	4.75 to 5.25
No. 1 busheling	7.50 to 8.00
No. 2 busheling	2.50 to 3.00
Rails for rolling	17.00 to 17.50
No. 1 locomotive tires	13.50 to 14.00
Short rails	17.75 to 18.25
Cast iron carwheels	12.75 to 13.25
No. 1 machinery cast.	12.25 to 12.75
No. 1 railroad cast.	12.25 to 12.75
Burnt cast	6.50 to 7.00
Stove plate	6.50 to 7.00
Agricul. malleable	11.00 to 11.50
Railroad malleable	13.50 to 14.00
Mixed hvy. cast	10.75 to 11.25

BIRMINGHAM

Per gross ton delivered to consumer:

Hvy. melting steel	\$13.00
Scrap steel rails	\$13.50 to 14.00
Short shov. turnings	7.50
Stove plate	9.50
Steel axles	18.50
Iron axles	18.50
No. 1 RR. wrought	10.00
Rails for rolling	16.00 to 16.50
No. 1 cast	15.00
Tramcar wheels	14.50 to 15.00

DETROIT

Dealers' buying prices per gross ton:

No. 1 hvy. mtng. in-trial steel	\$11.00 to \$11.50
No. 2 hvy. mtng. steel	10.00 to 10.50
Borings and Turnings	5.75 to 6.25
Long turnings	5.75 to 6.75
Short shov. turnings	6.50 to 7.00
No. 1 machinery cast.	13.00 to 13.50
Automotive cast	13.50 to 14.00
Hvy. breakable cast.	9.50 to 10.00
Stove plate	8.00 to 8.50
Hydraul. comp. sheets	12.50 to 13.00
New factory bushel.	11.00 to 11.50
Sheet clippings	8.25 to 9.25
Flashings	10.50 to 11.00
Low phos. plate scrap	13.00 to 13.50

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mtng. steel	\$11.50 to \$12.00
No. 2 hvy. mtng. steel	9.00 to 9.50
Hvy. breakable cast.	11.50 to 12.00
No. 1 machinery cast.	11.50 to 12.00
No. 2 cast	9.50 to 10.00
Stove plate	9.50 to 10.00
Steel car axles	15.00 to 15.50
Shafting	15.00 to 15.50
No. 1 RR. wrought	11.00 to 11.50
No. 1 wrought long	9.50 to 10.00
Spec. iron & steel pipe	9.00 to 9.50
Rails for rolling	16.00 to 16.50
Clean steel turnings*	4.50 to 5.00
Cast borings*	3.50 to 4.00
No. 1 blast furnace	3.50 to 4.00
Cast borings (chem.)	9.50 to 10.00
Unprepared yard scrap	6.00 to 6.50
Light iron	3.00 to 3.50
Per gross ton, delivered local foundries:	
No. 1 machn. cast†	\$13.50 to \$14.00
No. 2 cast†	10.50 to 11.00

* \$1.50 less for truck loads.

† Northern N. J. prices are \$3 to \$2.50 higher

BOSTON

Dealers' buying prices per gross ton:

Breakable cast	\$10.25 to \$10.50
Machine shop turn.	3.88
Mixed bor. & turn.	2.00 to 2.25
Bun. skeleton long	8.15
Shafting	16.00 to 16.15
Cast bor. chemical	5.00 to 6.00
Per gross ton delivered consumers' yards:	
Textile cast	\$14.00 to \$14.50
No. 1 machine cast.	13.50 to 14.50
Per gross ton delivered dealers' yards:	
No. 1 hvy. mtng. steel	\$12.00 to \$12.25
No. 2 steel	10.50 to 10.75

PACIFIC COAST

Per gross ton delivered to consumer:

No. 1 hvy. mtng. steel	\$13.00 to \$13.50
No. 2 hvy. mtng. steel	12.50 to 13.00

CANADA

Dealers' buying prices at their yards, per gross ton:

Toronto Montreal	
No. 1 hvy. mtng. steel.	\$9.25 \$8.75
No. 2 hvy. mtng. steel.	8.00 7.50
Mixed dealers steel	6.75 6.25
Drop forge flashings	8.25 7.75
New loose clippings	4.25 3.75
Busheling	3.75 3.25
Scrap pipe	4.25 3.75
Steel turnings	4.25 3.75
Cast borings	3.75 3.25
Machinery cast	14.00 13.50
Dealers cast	12.00 11.50
Stove plate	8.00 7.50

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, barrow	
No. 1 hvy. mtng. steel.	\$12.50 to \$13.00
No. 2 hvy. mtng. steel.	11.00 to 11.50
No. 2 cast	10.50 to 11.00
Stove plate	9.50 to 10.00
Boston on cars at Army Base or Mystic Wharf	
No. 1 hvy. mtng. steel.	\$14.00 to \$14.25
No. 2 hvy. mtng. steel.	13.00
Rails (scrap)	14.00 to 14.25
Philadelphia, delivered alongside boats, Port Richmond.	
No. 1 hvy. mtng. steel.	\$15.00 to \$15.25
No. 2 hvy. mtng. steel.	13.50 to 13.75

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

Steel prices on these pages are base prices only and f.o.b. mill unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases the amount of freight which must be absorbed in order to meet competition.

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Re-rolling only). Prices delivered Detroit are \$2 higher. F.o.b. Duluth, billets only, \$2 higher.

Per Gross Ton

Re-rolling\$34.00
Forging quality 40.00

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton

Open hearth or besse-mer\$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

Per Lb.

Grooved, universal and sheared1.90c.

Wire Rods

(No. 5 to 9/32 in.)

Per Gross Ton

Pittsburgh, Chicago or Cleveland\$43.00
Worcester, Mass. 45.00
Birmingham 43.00
San Francisco 52.00
Rods over 9/32 in. or 47/64 in., inclusive, \$5 a ton over base.

SOFT STEEL BARS

Base per Lb.

Pittsburgh, Chicago, Gary, Cleveland, Buffalo and Birmingham 2.15c.
Detroit, delivered 2.25c.
Duluth 2.25c.
Philadelphia, delivered 2.47c.
New York 2.49c.
On cars dock Gulf ports 2.50c.
On cars dock Pacific ports 2.75c.

RAIL STEEL BARS

(For merchant trade)

Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham 2.00c.
On cars dock Tex. Gulf ports 2.45c.
On cars dock Pacific ports 2.70c.

BILLET STEEL REINFORCING BARS

(Straight lengths as quoted by distributors)

Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Cleveland, Youngstown or Sparrows Pt. 1.90c.
Detroit, delivered 2.00c.
On cars dock Tex. Gulf ports 2.25c.
On cars dock Pacific ports 2.35c.

RAIL STEEL REINFORCING BARS

(Straight lengths as quoted by distributors)

Pittsburgh, Chicago, Gary, Buffalo, Cleveland, Youngstown or Birmingham 1.80c.
Detroit, delivered 1.90c.
On cars dock Tex. Gulf ports 2.15c.
On cars dock Pacific ports 2.25c.

IRON BARS

Chicago and Terra Haute 2.15c.
Pittsburgh (refined) 3.60c.

COLD FINISHED BARS AND SHAFTING*

Pittsburgh, Buffalo, Cleveland, Chicago, and Gary 2.65c.
Detroit 2.70c.

* In quantities of 10,000 to 10,000 lb.

PLATES

Base per Lb.

Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont, Del. 2.10c.*
Philadelphia, del'd 2.05c. to 2.15c.
New York, del'd 2.19c. to 2.29c.
On cars dock Gulf ports 2.45c.
On cars dock Pacific ports 2.60c.
Wrought iron plates, P'tg. 3.80c.

* Subject to concessions, particularly in the East, of \$2 a ton.

FLOOR PLATES

Pittsburgh or Chicago 3.35c.
New York, del'd 3.71c.
On cars dock Gulf ports 3.70c.
On cars dock Pacific ports 3.95c.

STRUCTURAL SHAPES

Base per Lb.

Pittsburgh, Chicago, Gary, Buffalo, Bethlehem or Birmingham 2.10c.
Philadelphia, del'd 2.215c.
New York, del'd 2.27c.
On cars dock Gulf ports 2.45c.
On cars dock Pacific ports 2.70c.

STEEL SHEET PILING

Base per Lb.

Pittsburgh, Chicago or Buffalo 2.40c.
On cars dock Gulf ports 2.85c.
On cars dock Pacific ports 2.90c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton\$40.00
Angle bars, per 100 lb. 2.70

F.o.b. Basing Points

Light rails (from billets) per gross ton\$40.00
Light rails (from rail steel) per gross ton 39.00

Base per Lb.

Cut spikes 3.00c.
Screw spikes 4.55c.
Tie plates, steel 2.15c.
Tie plates, Pacific Coast ports. 2.25c.
Track bolts, to steam railroads 4.15c.
Track bolts to jobbers, all sizes (per 100 counts) 65-5
Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnesota, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa.; Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS

Hot Rolled

Base per Lb.

Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown or Chicago 2.00c.
Detroit, delivered 2.10c.
Philadelphia, delivered 2.17c.
Granite City 2.10c.
On cars dock Pacific ports 2.50c.
Wrought iron, Pittsburgh 4.10c.

Cold Rolled*

Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown or Chicago 3.05c.
Detroit, delivered 3.15c.
Granite City 3.15c.
Philadelphia, delivered 3.37c.
On cars dock Pacific ports 3.65c.

* Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base.

From May 10 up to and including May 15, reductions from the base price of hot and cold rolled sheets running from \$4 to \$8 a ton were prevalent. Concessions withdrawn, on May 15.

Subsequent to May 15, many orders originally placed at \$4 to \$8 below the base price were adjusted to the full \$8 concession.

Galvanized Sheets, 24 Gage

Pittsburgh, Chicago, Gary, Sparrows Point, Buffalo, Middletown, Youngstown or Birmingham 3.50c.
Philadelphia, del'd 3.67c.
Granite City 3.60c.
On cars dock Pacific ports 4.00c.
Wrought iron, Pittsburgh 6.10c.

Electrical Sheets (F.o.b. Pittsburgh)

Base per Lb.

Field grade 3.20c.
Armature 3.55c.
Electrical 4.05c.
Motor 4.95c.
Dynamo 5.65c.
Transformer 72 6.15c.
Transformer 65 7.15c.
Transformer 58 7.65c.
Transformer 52 8.45c.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extra plus \$5c per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

Long Ternes

No. 24 unassorted 8-lb. coating f.o.b. Pittsburgh or Gary 3.80c.
F.o.b. cars dock Pacific ports. 4.50c.

Vitreous Enameling Stock, 20 Gage*

Pittsburgh, Chicago, Gary, Youngstown, Middletown or Cleveland 3.35c.
Detroit, del'd 3.45c.
Granite City 2.45c.
On cars dock Pacific ports 3.95c.

TIN MILL PRODUCTS

*Tin Plate

Per Base Box

Standard cokes, Pittsburgh, Chicago and Gary\$5.00
Standard cokes, Granite City.. 5.10

* Prices effective Nov. 10 on shipments through first quarter of 1939.

Special Coated Manufacturing Ternes

Per Base Box

Granite City\$4.40
Pittsburgh or Gary 4.30

Roofing Ternes Plate

(F.o.b. Pittsburgh)

(Per Package, 112 sheets, 20 x 28 in.)
8-lb. coating I.C.\$12.00
15-lb. coating I.C. 14.00
20-lb. coating I.C. 15.00
25-lb. coating I.C. 16.00
30-lb. coating I.C. 17.25
40-lb. coating I.C. 19.50

Black Plate, 29 gage and lighter

Pittsburgh, Chicago and Gary 3.05c.
Granite City 3.15c.
On cars dock Pacific ports, boxed 4.00c.

HOT ROLLED STRIP

(Widths up to 12 in.)

Base per Lb.

Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown or Birmingham 2.00c.
Detroit, delivered 2.10c.

Cooperage Stock

Pittsburgh & Chicago 2.10c.

From May 10 up to and including May 15, reductions in the base price of hot rolled strip running from \$4 to \$8 a ton were prevalent. Concessions withdrawn on May 15.

Subsequent to May 15, many orders originally placed at \$4 to \$8 below the base price were adjusted to the full \$8 concession.

COLD ROLLED STRIP*

Base per Lb.

Pittsburgh, Youngstown or Cleveland 2.80c.
Chicago 2.90c.
Detroit, delivered 2.90c.
Worcester 3.00c.

* Carbon 0.25 and less.

Commodity Cold Rolled Strip

Pittsburgh, Youngstown, or Cleveland 2.95c.
Detroit, delivered 3.05c.
Worcester 3.35c.

From May 10 up to and including May 15, reductions from the base price of cold rolled strip amounting to \$4 a ton were prevalent. Concessions withdrawn on May 15.

COLD ROLLED SPRING STEEL

Pittsburgh and Cleveland Worcester

Carbon	0.26-0.50%	2.80c.	3.00c.
Carbon	0.51-0.75	4.30c.	4.50c.
Carbon	0.76-1.00	6.15c.	6.35c.
Carbon	1.01-1.25	8.35c.	8.55c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh, Chicago, Cleveland and Birmingham)

To Manufacturing Trade

	Per Lb.
Bright wire	2.60c.
Galvanized wire, base.....	2.65c.*
Spring wire	3.20c.

* On galvanizing wire to manufacturing trade, size and galvanizing extras are charged, the price Nos. 6 to 9 gage, inclusive, thus being 3.15c.

To the Trade

	Base per Keg
Standard wire nails	\$2.40
Coated nails	2.40
Cut nails, carloads	3.60

Base per 100 Lb.

Annealed fence wire	\$2.90
Galvanized fence wire	3.30
Polished staples	3.10
Galvanized staples	3.35
Twisted barless wire	3.25
Woven wire fence, base column. 67	
Single loop bale ties, base col. 56	
Stand. 2 pt., 12.5 gage barbed cattle wire, per 80 rod spool....	\$2.58
Stand. 2 pt., 12.5 gage barbed hog wire, per 80 rod spool....	\$2.76

Note: Birmingham base same on above items, except spring wire.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel	Black Galv.	Wrought Iron	Black Galv.
1/2 in.	56 36	1/2 in.	56 36
3/4 in.	59 43 1/2	3/4 in.	59 43 1/2
1 in.	63 1/2 54	1 in.	63 1/2 54
1 1/4 in.	66 1/2 60 1/2	1 1/4 in.	66 1/2 60 1/2
1 1/2 in.	68 1/2 60 1/2	1 1/2 in.	68 1/2 60 1/2

Lap Weld

1/2 in.	61 52 1/2	1/2 in.	61 52 1/2
3/4 in.	64 55 1/2	3/4 in.	64 55 1/2
1 in.	66 57 1/2	1 in.	66 57 1/2
1 1/4 in.	68 59 1/2	1 1/4 in.	68 59 1/2
1 1/2 in.	69 59 1/2	1 1/2 in.	69 59 1/2

Butt weld, extra strong, plain ends	
1/2 in.	54 1/2 41 1/2
3/4 in.	56 1/2 45 1/2
1 in.	61 1/2 37 1/2
1 1/4 in.	65 1/2 57 1/2
1 1/2 in.	67 60

Lap weld, extra strong, plain ends	
1/2 in.	59 51 1/2
3/4 in.	63 55 1/2
1 in.	66 59
1 1/4 in.	68 56
1 1/2 in.	69 55

On butt weld and lap weld steel pipe fobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 35 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount of \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher, on all butt weld 8 in. and smaller.

Boiler Tubes

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall. (Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

	Seamless	Weld
	Cold Drawn	Hot Rolled
1 in. o.d.	13 B.W.G. \$ 9.01	13 B.W.G. \$ 7.82
1 1/4 in. o.d.	13 B.W.G. 10.87	13 B.W.G. 9.26
1 1/2 in. o.d.	13 B.W.G. 11.70	13 B.W.G. 10.23
1 3/4 in. o.d.	13 B.W.G. 13.42	13 B.W.G. 11.64
2 in. o.d.	13 B.W.G. 15.03	13 B.W.G. 13.04
2 1/4 in. o.d.	13 B.W.G. 16.76	13 B.W.G. 14.54
2 1/2 in. o.d.	13 B.W.G. 18.45	13 B.W.G. 16.01
2 3/4 in. o.d.	13 B.W.G. 20.21	13 B.W.G. 17.54
3 in. o.d.	13 B.W.G. 21.42	13 B.W.G. 18.99
3 1/4 in. o.d.	13 B.W.G. 22.48	13 B.W.G. 19.50
3 1/2 in. o.d.	13 B.W.G. 23.87	13 B.W.G. 20.62
3 3/4 in. o.d.	13 B.W.G. 25.20	13 B.W.G. 21.66
4 in. o.d.	13 B.W.G. 26.54	13 B.W.G. 22.66
4 1/4 in. o.d.	13 B.W.G. 28.04	13 B.W.G. 23.75
4 1/2 in. o.d.	13 B.W.G. 29.01	13 B.W.G. 24.25
4 3/4 in. o.d.	13 B.W.G. 30.98	13 B.W.G. 25.14

Extras for less carload quantities:

50,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	30%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

CAST IRON WATER PIPE

Per Net Ton

*6-in. and larger, del'd Chicago.....	\$51.00
6-in. and larger, del'd New York.....	49.00
*6-in. and larger, Birmingham.....	43.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles.....	53.00
F.o.b. dock, Seattle	52.00
4-in. f.o.b. dock, San Francisco or Los Angeles	55.00
F.o.b. dock, Seattle	52.00

Class "A" and gas pipe, \$3 extra 4-in. pipe is \$3 a ton above 6-in.

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is \$42, Birmingham, and \$5 delivered Chicago and 4-in. pipe, \$45, Birmingham, and \$54 delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland Birmingham or Chicago)

Per Cent Off List

Machine and carriage bolts:	
1/2 in. and 6 in. and smaller.....	68 1/2
Larger and longer up to 1 in.	66
1 1/4 in. and larger	64
Lag bolts	66
Plow bolts, Nos. 1, 2, 3, and 7	68 1/2
Hot pressed nuts, and c.p.c. and t-nuts, square or hex. blank or tapped:	
1/2 in. and smaller	67
9/16 in. to 1 in. inclusive.....	64
1 1/4 in. and larger	62

On the above items with the exception of plow bolts, there is an additional allowance of 10 per cent for full container quantities.

On all of the above items there is an additional 5 per cent allowance for carload shipments.

Semi-fin. hexagon nuts U.S.S. S.A.E.	
1/2 in. and smaller	67 70
9/16 to 1 in.	64 65
1 1/4 in. and larger.....	62 62

In full container lots, 10 per cent additional discount.

Stove bolts in packages, nuts attached	72 1/2
Stove bolts in packages, with nuts separate	72 1/2 and 12 1/2
Stove bolts in bulk.....	84

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets

(1/2 in. and larger)

Base Per 100 Lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	\$3.40
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Small Rivets

(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland Chicago, Birmingham	65 and 10
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Cap and Set Screws

(Freight allowed to destination)

Per Cent Off List

Milled hexagon head, cap screws, 1 in. dia. and smaller.....	50 and 10
Milled headless set screws, cut thread 1/4 in. and smaller.....	70
Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller	67 1/2
Upset set screws, cup and oval points	75
Milled studs	60

Alloy Steel

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem. Base price, \$56.00 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton. Open-hearth grade, base.....	2.70c.
Delivered, Detroit	2.80c.
S.A.E. Alloy Series	
Numbers	Differential per 100 Lb.
200 (1 1/2% Nickel).....	\$0.35

2100 (1 1/2% Nickel)	\$0.75
2300 (3 1/2% Nickel)	1.55
2500 (5% Nickel)	2.25
3100 Nickel-chromium	0.70
3200 Nickel-chromium	1.85
3300 Nickel-chromium	3.80
3400 Nickel-chromium	3.20
4100 Chromium-molybdenum (0.15 to 0.25 Molybdenum) ..	0.55
4100 Chromium-molybdenum (0.25 to 0.40 Molybdenum) ..	0.75
4340 Chr.-Ni.-Mo.	1.65
4345 Chro.-Ni.-Mo.	1.55
4600 Nickel - molybdenum (0.20 to 0.30 Mo. 1.50 to 2.00 Ni.) ..	1.10
5100 Chrome steel (0.60-0.90 Cr.) ..	0.35
5100 Chrome steel (0.80-1.10 Cr.) ..	0.45
6100 Chromium spring steel.....	0.15
6100 Chromium-vanadium bar....	1.20
6100 Chromium-vanadium spring steel	0.85
Chromium-nickel vanadium	1.50
Carbon-vanadium	0.35

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2 1/2 in. thick or over take the billet base.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.35c. base per lb. Delivered Detroit, 3.45c., carlots

STAINLESS & HEAT RESISTANT ALLOYS

(Base prices, cents per lb. f.o.b. Pittsburgh)

Chrome-Nickel

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25c.	24c.
Plates	29c.	27c.
Structural shapes..	26c.	24c.
Sheets	36c.	34c.
Hot-rolled strip	23.50c.	21.50c.
Cold-rolled strip ...	30c.	28c.
Drawn wire	25c.	24c.

Straight Chrome

	No. 410	No. 430	No. 442	No. 446
Bars 18.50c. 19c.	22.50c.	22.50c.	27.50c.	27.50c.
Plates 21.50c. 22c.	25.50c.	25.50c.	30.50c.	30.50c.
Sheets 26.50c. 29c.	32.50c.	32.50c.	36.50c.	36.50c.
Hot stp. 17c. 17.50c.	24c.	24c.	35c.	35c.
Coldstp. 22c. 22.50c.	32c.	32c.	52c.	52c.

TOOL STEEL

High speed	67c.
High-carbon-chrome	43c.
Oil-hardening	24c.
Special	23c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 2c. a lb. higher.

British and Continental

BRITISH

Per Gross Ton f.o.b. United Kingdom Ports

Ferromanganese, export	Nominal
Tin plate, per base box	20s. 3d. to 21s.
Steel bars, open hearth.....	£10 8s.
Beams, open hearth.....	£10
Channels, open hearth.....	£10 5s.
Angles, open-hearth.....	£10
Black sheets, No. 24 gage.....	£13
Galvanized sheets, No. 24 gage	£15 15s.

CONTINENTAL

Per Gross Ton, Gold £ f.o.b. Continental Ports

Billets, Thomas	Nominal
Wire rods, No. 5 B.W.G.	£5 10s.
Steel bars, merchant	£5 5s.
Sheet Bars	Nominal
Plate 1/4 in. and up.....	£5 7s.
Plate 3/16 in. and 5 mm.	£5 13s.
Sheet 1/4 in.	£5 9s. 6d.
Beams, Thomas	£4 18s.
Angles (Basic)	£4 18s.
Hoops and strip, base.....	£5 12s.

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	\$22.00
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	22.00
Delivered Brooklyn	24.50
Delivered Newark or Jersey City	23.53
Delivered Philadelphia	22.84
F.o.b. Neville Island, Erie, Pa. Toledo, Chicago, Granite City, Cleveland and Youngstown... ..	21.00
F.o.b. Buffalo	21.00
F.o.b. Detroit	21.00
Southern, delivered Cincinnati Northern, delivered, Cincinnati	21.44
F.o.b. Duluth	21.50
F.o.b. Provo, Utah	19.00
Delivered, San Francisco, Los Angeles or Seattle	24.50
F.o.b. Birmingham*	17.38

* Delivered prices on southern iron for shipment to northern points are 35c. a ton above delivered prices from nearest northern basing point on iron with phosphorus content of 0.70 per cent and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same, except at Birmingham and Provo, which are not malleable iron basing points.

Basic

F.o.b. Everett, Mass.	\$21.50
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	21.50
F.o.b. Buffalo	20.00
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown... ..	20.50
Delivered Philadelphia	22.34
Delivered Canton, Ohio	21.89
Delivered Mansfield, Ohio	22.44
F.o.b. Birmingham	16.00

Bessemer

F.o.b. Buffalo	\$22.00
F.o.b. Everett, Mass.	23.00
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	23.00
Delivered Newark or Jersey City	24.53
Erie, Pa., and Duluth	22.00
F.o.b. Neville Island, Toledo, Chicago and Youngstown ...	21.50
F.o.b. Birmingham	22.00
Delivered Cincinnati	22.11
Delivered Canton, Ohio	22.89
Delivered Mansfield, Ohio	23.44

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.	\$26.50
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Gray Forge

Valley or Pittsburgh furnace...	\$20.50
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Charcoal

Lake Superior furnace	\$25.00
Delivered Chicago	28.34

Canadian Pig Iron

Per Gross Ton

Foundry iron	\$24.50 base
Malleable	25.00 base
Basic	24.50 base

Toronto

Foundry iron	\$22.50 base
Malleable	23.00 base
Basic	22.50 base

On all grades 3.35 per cent silicon and under is base. For each 25 points of silicon over 3.35 per cent an extra of 23c. is charged.

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload)\$30.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%\$28.00
Domestic, 26 to 28% 33.00

Electric Ferrosilicon

Per Gross Ton Delivered:

Lump Size

60% (carload lots, bulk)\$69.50*
50% (ton lots in 50 gal. bbl.)... 80.50*
75% (carload lots, bulk)126.00*
75% (ton lots in 50 gal. bbl.)...139.00*

Bessemer Ferrosilicon

F.o.b. Furnace, Jackson, Ohio

Per Gross Ton

10.00 to 10.50%\$30.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.

For each unit of manganese over 2%, \$1 per ton additional.
Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton

F.o.b. Jackson, Ohio, 5.00 to

5.50%\$24.50

For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton. The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Ferrocchrome

Per Lb. Contained Cr., Delivered

Carlots, Lump Size, on Contract

4 to 6% carbon10.50c.*
2% carbon16.50c.*
1% carbon17.50c.*
0.10% carbon19.50c.*
0.06% carbon20.00c.*

Silico-Manganese

Per Gross Ton, Delivered, Lump

Size, Bulk, on Contract

3% carbon\$83.00
2.50% carbon 88.00
2% carbon 93.00
1% carbon103.00

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads... \$1.75
Ferrotungsten, 100 lbs. and less 2.00

Ferrovandium, contract, per lb. contained V., delivered\$2.70 to \$2.90†

Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y., ton lots \$2.25†

Ferrocobaltititanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton\$142.50

Ferrocobaltititanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton\$157.50

Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage, freight equalized with Rockdale, Tenn., per gross ton\$53.50

Ferrophosphorus, electrolytic, 23-26% in car lots, f.o.b. Monsanto (Siglo), Tenn., 24%, per gross ton, \$3 unitage, freight equalized with Nashville\$75.00

Ferromolybdenum, per lb. Mo. f.o.b. furnace 95c.

Calcium molybdate, per lb. Mo. f.o.b. furnace 80c.

Molybdenum oxide briquettes 48-52% Mo; per lb. contained Mo, f.o.b. Langeloth, Pa. 80c.

* Spot prices are \$5 per ton higher.

† Spot prices are 10c. per lb. of contained element higher.

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, Bessemer, 51.50%...\$5.25
Old range, non-Bessemer, 51.50%... 5.10
Messabi, Bessemer, 51.50%... 5.10
Messabi, non-Bessemer, 51.50%... 4.94
High phosphorus, 51.50%... 4.84

Foreign Ore

C.A.F. Philadelphia or Baltimore

Per Unit

Iron, low phos., copper free, 55 to 58% dry, Algeria 12c.
Iron, low phos., Swedish, average, 68½% iron 12c.
Iron, basic or foundry, Swedish, aver. 65% iron.....10½c.
Iron, basic or foundry, Russian, aver. 65% iron.....Nominal
Man., Caucasian, washed 52% 29c.
Man., African, Indian, 44-48% 35c.
Man., African, Indian, 49-51% 30c.
Man., Brazilian, 46 to 48% 27c.

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered\$18.00
Tungsten, domestic, scheelite delivered\$16.00 to \$17.00
Chrome or (lump) c.i.f. Atlantic Seaboard, per gross ton: South African (low grade)\$15.00
Rhodesian, 45% 19.00
Rhodesian, 48% 22.00
Turkish, 48-49% 22.50
Turkish, 45-56% 19.50
Turkish, 40-41% 17.00
Chrome concentrates (Turkish) c.i.f. Atlantic Seaboard, per gross ton: 50%\$24.00
48-49% 21.50

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail\$16.00 to \$17.00
Domestic, f.o.b. Ohio River landing barges\$16.50 to 17.50
No. 2 lump, 85-5, f.o.b. Kentucky and Ill. mines.\$17.00 to 18.00
Foreign, 85% calcium fluoride, over 5% silicon, c.i.f. Atlantic ports, duty paid..... 21.50
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines.... 31.50

FUEL OIL

Per Gal

No. 2, f.o.b. Bayonne, N. J.\$3.875c.
No. 6, f.o.b. Bayonne, N. J. 2.50c.
No. 5 Bur. Stds., del'd Chicago 3.25c.
No. 6 Bur. Stds., del'd Chicago 2.75c.
No. 3 distillate, del'd Cleve'd. 5.50c.
No. 4 industrial, del'd Cleve'd. 5.25c.
No. 5 industrial, del'd Cleve'd. 2.75c.
No. 6 industrial, del'd Cleve'd. 2.50c.

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, Prompt \$3.75
Furnace, f.o.b. Connellsville, Prompt\$4.75 to 5.00
Foundry, by - product Chicago ovens 10.35
Foundry, by - product, del'd New England... 12.50
Foundry, by - product, del'd Newark or Jersey City10.88 to 11.40
Foundry, by - product, Philadelphia 10.95
Foundry, by - product, delivered Cleveland .. 10.30
Foundry, by - product, delivered Cincinnati .. 9.75
Foundry, Birmingham... 7.50
Foundry, by - product, del'd St. Louis industrial district10.75 to 11.00
Foundry, from Birmingham, f.o.b. cars dock Pacific ports 14.75

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH*

	Base per Lb.
Plates	3.40c.
Shapes	3.40c.
Soft steel bars and small shapes	3.35c.
Reinforcing steel bars	2.70c.
Cold finished bars and screw stock	3.65c.
Hot rolled strip	3.60c.
Hot rolled sheets	3.35c.
Galv. sheets (24 ga.) 500 lb. to 1499 lb.	4.50c.
Wire, black, soft annealed	3.15c.
Wire, galv., soft	3.55c.
Track spikes (1 to 24 kegs)	3.60c.
Wire nails (in 100-lb. kegs)	2.65c.

On plates, structurals, bars, strip and hot rolled sheets, base applied to orders of 400 to 1999 lb.
On reinforcing bars base applies to orders of less than one ton and includes switching and carrying charge.
All above prices for delivery within the Pittsburgh switching district.

NEW YORK

	Base per Lb.
Plates, 1/4 in. and heavier	3.74c.
Structural shapes	3.75c.
Soft steel bars, round	3.84c.
Iron bars, Swed. charcoal	7.25c.
Cold-fin. shafting and screw stock:	
Rounds, squares, hexagons	4.09c.
Flats up to 12 in. wide	4.09c.
Cold-rolled strip soft and quarter hard	3.51c.
Hot-rolled strip, soft O.H.	3.96c.
*Hot-rolled sheets (8-30 ga.)	3.40c.
Galv. sheets (24 ga.)	4.50c.
Long ternes (24 ga.)	5.50c.
Cold-rolled sheets (20 ga.)	
Standard quality	4.60c.
Deep drawing	4.85c.
Stretcher leveled	5.10c.
SAE, 2300, hot-rolled	7.35c.
SAE, 3100, hot-rolled	5.90c.
SAE, 6100, hot-rolled annealed	8.75c.
SAE, 2300, cold-rolled	8.59c.
SAE, 3100, cold-rolled, annealed	8.19c.
Floor plate, 1/4 in. and heavier	5.56c.
Standard tool steel	12.50c.
Wire, black, annealed (No. 9)	4.35c.
Wire, galv. (No. 9)	4.70c.
Open-hearth spring steel	4.75c. to 10.25c.
Common wire nails, per keg in lots of five kegs or more	\$2.65

*For lots less than 2000 lb.

CHICAGO

	Base per Lb.
Plates and structural shapes	3.55c.
Soft steel bars, rounds and angles	3.50c.
Soft steel squares, hexagons, channels and Tees	3.65c.
Hot rolled strip	3.60c.
Floor plates	5.15c.
Hot rolled sheets	3.35c.
Galvanized sheets	4.25c.
Cold rolled sheets	4.30c.
Cold finished carbon bars	3.75c.
Above prices are subject to deductions and extras for quantity and are f.o.b. consumer's plant within Chicago free delivery zone.	

CLEVELAND

	Base per Lb.
Plates	3.40c.
Structural shapes	3.58c.
Soft steel bars	3.25c.
Reinfor. bars (under 2000 lb.)†	2.55c.
Cold-fin. bars (1000 lb., over.)	3.75c.
Hot-rolled strip	3.50c.
Cold rolled sheets	4.55c.
Cold-finished strip	3.20c.
Galvanized sheets (No. 24)	4.62c.
Hot-rolled sheets	3.35c.
Floor plates, 3/16 in. and heavier	5.18c.
*Black ann'd wire, per 100 lb.	\$3.10
*No. 9 galv. wire, per 100 lb.	3.50
*Com. wire nails, base per keg	2.60
Hot rolled alloy steel (3100)	5.85c.
Cold rolled alloy steel (3115)	6.75c.

* For 5000 lb. or less.
† 500 lb. base quantity.
Prices shown on hot rolled bars, strip, sheets, shapes and plates are for 400 to 1999 lb. Alloy steel, 1000 lb. and over; galvanized sheets, 150 to 1499 lb.; cold rolled sheets, 399 lb. and under.

ST. LOUIS

	Base per Lb.
Plates and structural shapes	3.47c.
Bars, soft steel (rounds and flats)	3.62c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	3.77c.
Cold fin. rounds, shafting, screw stock	4.02c.
Galv. sheets (24 ga.)	4.53c.
Hot rolled sheets	3.38c.
Galv. corrugated sheets, 24 ga. and heavier*	4.58c.
Structural rivets	5.02c.

* No. 28 and lighter take special prices.

BOSTON

	Base per Lb.
Structural shapes, 3 in. and larger	3.85c.
Plates, 1/4 in. and heavier	3.85c.
Bars	3.88c.
Heavy hot rolled sheets	3.71c.
Hot rolled sheets	4.21c.
Hot rolled annealed sheets	4.61c.
Galvanized sheets	4.61c.
Cold rolled sheets	4.71c.
The following quantity differentials apply: Less than 100 lb., plus \$1.50 per 100 lb.; 100 to 399 lb. plus 50c.; 400 to 1999 lb. base; 2000 to 9999 lb., minus 20c.; 10,000 to 39,999 lb. minus 30c.; 40,000 lb. and over minus 40c.	

BUFFALO

	Base per Lb.
Plates	3.62c.
Floor plates	5.25c.
Struc. shapes	3.40c.
Soft steel bars	3.35c.
Reinforcing bars (20,000 lb. or more)	2.05c.
Cold-fin. flats, squares, rounds, and hex.	3.65c.
Hot-rolled sheets, 3/16 x 14 in. to 48 in. wide incl., also sizes No. 8 to 30 ga.	3.35c.
Galv. sheets (24 ga.)	4.50c.
Bands and hoops	3.82c.

NEW ORLEANS

	Base per Lb.
Mild steel bars	4.20c.
Reinforcing bars	3.24c.
Structural shapes	4.10c.
Plates	4.10c.
Hot-rolled sheets, No. 10	4.35c.
Steel bands	4.75c.
Cold-finished steel bars	5.10c.
Structural rivets	4.85c.
Boiler rivets	4.85c.
Common wire nails, base per keg	3.55
Bolts and nuts, per cent off list	60

REFRACTORIES PRICES

	Per 1000 f.o.b. Works
Fire Clay Brick	
Super-duty brick, at St. Louis	\$60.80
First quality Pennsylvania, Maryland, Kentucky, Missouri and Illinois	47.50
First quality, New Jersey	52.50
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	42.75
Second quality, New Jersey	49.00
No. 1 Ohio	39.90
Ground fire clay, per ton	7.10
Silica Brick	
Per 1000 f.o.b. Works	
Pennsylvania	\$47.50
Chicago District	55.10
Birmingham	47.50
Silica cement per net ton (Eastern)	8.55

	Net per Ton
Chrome Brick	
Standard f.o.b. Baltimore, Plymouth Meeting and Chester	\$47.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	47.00
Magnesite Brick	
Standard f.o.b. Baltimore and Chester	\$67.00
Chemically bonded, f.o.b. Baltimore	57.00
Grain Magnesite	
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	\$45.00
Domestic, f.o.b. Baltimore and Chester in sacks	40.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

PHILADELPHIA

	Base per Lb.
*Plates, 1/4-in. and heavier	3.40c.
*Structural shapes	3.40c.
*Soft steel bars, small shapes, iron bars (except bands)	3.60c.
†Reinforc. steel bars, square and deformed	2.61c.
Cold-finished steel bars	4.06c.
*Steel hoops	4.10c.
*Steel bands, No. 12 and 3/16 in. incl.	3.60c.
*Spring steel	4.75c.
†Hot-rolled anneal. sheets	3.40c.
†Galvanized sheets (No. 24)	4.23c.
*Diam. pat. floor plates, 1/4 in.	5.00c.

These prices are for delivery in Philadelphia trucking area.

*For quantities between 400 and 1999 lb.

†For 10 bundles or over.

‡For one to five tons.

BIRMINGHAM

	Base per Lb.
Bars and bar shapes	3.50c.
Structural shapes and plates	3.55c.
Hot rolled sheets No. 10 ga.	3.35c.
Galvanized sheets No. 24 ga.	4.75c.
or more	
Strip	3.60c.
Reinforcing bars	3.50c.
Floor plates	5.58
Cold finished bars	4.43
Machine and carriage bolts	.50 & 10 off list
Rivets (structural) \$4.60 base	
On plates, shapes, bars, hot-rolled strip, heavy hot-rolled sheets, the base applies on 400 to 1999 lb. All prices are f.o.b. consumer plant.	

PACIFIC COAST

	San Francisco	Los Angeles	Seattle
Plates, tanks and			
U. M.	2.45c.	2.80c.	3.85c.
Shapes, standard	3.45c.	3.80c.	3.95c.
Soft steel bars	3.50c.	3.80c.	3.90c.
Reinforcing bars, f.o.b. cars dock			
Pacific ports	2.275c.	open.	2.975c.
Hot-rolled sheets (No. 10)	3.45c.	4.00c.	3.70c.
Galv. sheets (No. 24 and lighter)	5.15c.	4.75c.	5.00c.
Galv. sheets (No. 22 and heavier)	5.40c.	4.75c.	5.00c.
Cold-finished steel			
Rounds	6.55c.	6.60c.	7.10c.
Squares and hexagons	7.80c.	7.85c.	7.10c.
Flats	8.30c.	8.35c.	8.10c.
Common wire nails—base per keg less carload	\$3.00	\$3.05	\$3.00

All items subject to differentials for quantity.

ST. PAUL

	Base per Lb.
Mild steel bars, rounds	4.10c.
Structural shapes	4.00c.
Plates	4.00c.
Cold-finished bars	4.83c.
Hot-rolled annealed sheets, No. 24	4.75c.
Galvanized sheets, No. 24	5.00c.

On mild steel bars, shapes and plates the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

DETROIT

	Base per Lb.
Soft steel bars	3.33c.
Structural shapes	3.65c.
Plates	3.60c.
Floor plates	5.27c.
Hot-rolled sheets, 8 to 30 gages above 12 in. and 3/16 in., 24 in. to 48 in. wide	3.43c.
Cold-rolled sheets	4.50c.
*Galvanized sheets	4.59c.
Hot-rolled strip, under No. 12	3.63c.
Hot-rolled strip, No. 12 and over	3.43c.
Cold-finished bars	3.80c.
Cold-rolled strip	3.55c.
Hot-rolled alloy steel (SAE 3100 Series)	5.97c.
Cold-rolled alloy (SAE 2300)	8.45c.

Quantity extras apply to all items.
*Price applies only in metropolitan Detroit.

FABRICATED STEEL

... Lettings in fair volume at 19,505 tons ... New projects lower at 9680 tons as against 12,350 tons last week ... Plate awards in good volume at 8050 tons.

NORTH ATLANTIC STATES AWARDS

- 1250 Tons, New York, office building for Aetna Life Insurance Co., to American Bridge Co., Pittsburgh.
- 1000 Tons, Brooklyn, Paedergat Basin bridge, MS-39.3, to American Bridge Co.
- 900 Tons, Bridgeport, N. J., state bridge over Raccoon Creek, to American Bridge Co.
- 850 Tons, Shohola, Pa., state bridge over Delaware River, to Bethlehem Steel Co., Bethlehem, Pa.
- 800 Tons, Gloucester County, Pa., bridge Route 44, to American Bridge Co.
- 665 Tons, Brooklyn, N. Y., Shore Parkway, Contract MS-39-S, to Harris Structural Steel, Plainfield, N. J.
- 650 Tons, Fulton, N. Y., warehouse for Peter Cailler Kohler Swiss Chocolate Co., to Bethlehem Steel Co.
- 570 Tons, Cumberland County, Pa., bridges for Pennsylvania Turnpike Commission, Sect. 19-20-E, to Bethlehem Steel Co.
- 525 Tons, Westmoreland County, Pa., highway bridge, section 2-C, for Pennsylvania Turnpike Commission, to Fort Pitt Bridge Works, Pittsburgh.
- 365 Tons, McKeesport, Pa., vocational high school, to Keystone Engineering Co., Pittsburgh.
- 350 Tons, Lewisburg, Pa., industrial building No. 3, for U. S. penitentiary, to Belmont Iron Works, Philadelphia.
- 350 Tons, Wyomissing, Pa., buildings Nos. 24 and 25 for Textile Machine Works, to Reading Steel Products Co.
- 240 Tons, Rochester, N. Y., service building, for Rochester Gas & Electric Corp., to F. L. Hughes & Co., Rochester.
- 215 Tons, New York, 3-story addition, 1220 Broadway, to Dreier Structural Steel Co.
- 190 Tons, Philadelphia, building for Horn & Hardart, to Bethlehem Fabricators, Inc.
- 165 Tons, Stratford, Conn., bridge, Merritt Parkway, route 8, to American Bridge Co.
- 155 Tons, New Haven, Conn., freight house and office building for New York, New Haven & Hartford Railroad, to Lehigh Structural Steel Co., Allentown, Pa.
- 130 Tons, Rensselaer County, N. Y., State Highway Bridge RC-4021, to American Bridge Co.
- 120 Tons, Springfield, Mass., building for L. W. Besse Estate, to Haarmann Steel Co., Holyoke, Mass.
- 100 Tons, Greenfield, Me., state bridge to Bethlehem Fabricators, Inc., Vulcan Construction Co., Boston, contractor.
- 100 Tons, Saratoga County, N. Y., Bridge FAGS-RC-4053, to American Bridge Co., Pittsburgh.

THE SOUTH

- 175 Tons, Tarrant County, Texas, Bridge FAGS-86-A, to Mosher Steel Co., Dallas, Texas.

CENTRAL STATES

- 2337 Tons, Powerton, Ill., steel towers for Commonwealth-Edison power line, to Blaw-Knox Co., Pittsburgh.
- 850 Tons, Galt, Ill., state bridge FA-141, section 110-F, to Bethlehem Steel Co.
- 650 Tons, Omaha, state highway bridge, to Omaha Steel Works, Omaha.
- 640 Tons, Detroit, driveway building for Ford Motor Co., to Whitehead & Kales Co., Detroit.
- 600 Tons, Riverview, Mich., manufacturing building for Firestone Steel Products Co., to Whitehead & Kales Co.
- 446 Tons, Independence, Kan., bridge, to J. B. Klein Iron & Foundry Co., Oklahoma City.
- 365 Tons, Ontonagon, Mich., state bridge over Ontonagon River, to Bethlehem Steel Co.
- 240 Tons, Highland Park, Mich., dynamometer building for Chrysler Corp. to Whitehead & Kales Co.
- 200 Tons, Petersburg, Ill., state bridge FA-142, section 3-VF, to American Bridge Co.
- 190 Tons, Rochester, Minn., Central High School addition, to Lakeside Bridge & Steel Co., Milwaukee.

- 160 Tons, Peoria, Ill., three buildings for Standard Brands, Inc., Hansell Elcock Co., Chicago.
- 145 Tons, Dearborn, Mich., slats for conveyor chain for Ford Motor Co., to unknown fabricator.
- 120 Tons, St. Louis, service and storage building for Greyhound Lines, to Truscon Steel Co., Youngstown.
- 115 Tons, Xunn County, Wis., Bridge 607, to Wausau Bridge Co., Wausau, Wis.

WESTERN STATES

- 550 Tons, Everett, Wash., Snohomish River bridge, to Pacific Car & Foundry Co., Seattle.
- 395 Tons, Cajon, Cal., bridge A-64, Atchison, Topeka & Santa Fe Railway Co., to American Bridge Co.
- 243 Tons, Lewis County, Wash., Riverside bridge, to Poole & McGonigle, Portland, Ore., through Angeles Gravel & Supply Co., contractor.
- 215 Tons, Colton, Cal., Santa Ana River Bridge, to Minneapolis Moline Power Implement Co., Minneapolis.
- 170 Tons, Honolulu, T. H., Kamehameha school, to Columbia Steel Co., San Francisco, through E. E. Black, Honolulu, contractor.

PENDING STRUCTURAL PROJECTS

NORTH ATLANTIC STATES

- 1000 Tons, New York, bridge, MS-39-15.
- 750 Tons, Washington, Thomas Jefferson High School; bids Aug. 15.
- 500 Tons, Elizabeth, N. J., office and garage building for Public Service Electric & Gas Co.
- 400 Tons, Portsmouth, N. H., machine and pipe shop for United States Government.
- 275 Tons, New Paltz, N. Y., bridge No. 135.
- 150 Tons, Wallingford, Conn., bridge over Quinipiac River.
- 125 Tons, Monroe County, Pa., highway bridge; bids Aug. 18.
- 120 Tons, Lynn, Mass., extension gear shop building No. 57, for General Electric Co.
- 115 Tons, York, Pa., alterations, post office, for United States Government.

THE SOUTH

- 450 Tons, Waterford Downs, W. Va., grandstand and paddock for Waterford Downs, Inc.
- 115 Tons, Boone County, Ky., state bridge over Woolper Creek.

CENTRAL STATES

- 1950 Tons, Chicago, section S3 subway, new bids asked Aug. 17, S. A. Healy, originally low.
- 500 Tons, Pittsburgh County, Okla., highway bridge, bids due Aug. 15.
- 450 Tons, Cleveland, Glenville High School, Hadlock Krill Co., Cleveland, general contractor (previously reported).
- 356 Tons, State of Missouri, three highway bridges, bids due Aug. 11.
- 300 Tons, Chicago, addition to Abbott Hall, Northwestern University, bids Aug. 30.
- 200 Tons, Evanston, Ill., Scott Hall, Northwestern University.
- 200 Tons, Ravenna, Neb., state bridge.
- 175 Tons, LaGrange, Ill., store building for Montgomery-Ward & Co.
- 125 Tons, Brighton, Ohio, rebuilding East End bridge No. 31 for Chesapeake & Ohio Railway Co.

WESTERN STATES

- 2800 Tons, Delta, Cal., Salt Creek and O'Brien Creek bridges, for Bureau of Reclamation; bids postponed to Aug. 14. Previously reported as closing Aug. 7.
- 1500 Tons, Wiota, Mont., tunnel intake reconstruction, Fort Peck Dam, for United States Government.
- 165 Tons, Ventura, Cal., bridge; bids Aug. 22.
- 104 Tons, Franktown, Colo., highway work; bids in.
- 100 Tons, Flagstaff, Ariz., Canyon Diablo bridge; bids Aug. 15.

FABRICATED PLATES AWARDS

- 7000 Tons, Grand Coluce Dam, Wash., drum gates for spillway, to American Bridge Co., Pittsburgh.
- 400 Tons, Cleveland, barges for Standard Oil of Ohio, to Nashville Bridge Co., Nashville, Ky.
- 250 Tons, Los Angeles Metropolitan Water District, 1,000,000 gal. tank to Pacific Iron & Steel Co., Los Angeles.
- 180 Tons, Plattsburg, N. Y., 3 storage tanks, 2-10M bbl., 95 tons, to Buffalo Tank Co., and 1-20M bbl., 85 tons to Chicago Bridge Works, Chicago.
- 120 Tons, Norwalk, Conn., 30,000 bbl. storage tank, for Meeker Coal Co., to Norwalk Tank Co.
- 100 Tons, Wiota, Mont., 500 reinforcing plates for pipe, U. S. Engineer's Office to Alan Wood Steel Co., Conshohocken, Pa.

PENDING PROJECTS

- 28,000 Tons, Chicago, subway section C3, new bids asked Aug. 17. Original low bidder S. A. Healy Co. Includes rib beams.

SHEET PILING AWARDS

- 700 Tons, Cleveland, Columbus Road bridge, to Carnegie-Illinois Steel Corp., Pittsburgh, through Western Foundation Co., contractor.

PENDING PROJECTS

- 1067 Tons, Wiota, Mont., United States engineer, Fort Peck (Invitation 631-40-27, alternate design B requires 1040 tons), bids in.
- 750 Tons, Cleveland, municipal light plant addition.
- 265 Tons, Dog Tooth Bend, Mo., for U. S. Engineer's office at Memphis, Tenn., bids due Aug. 15.

Australia to Build Ships By Government Subsidy

LONDON, Aug. 8 (By Cable)—Australia has decided to subsidize shipbuilding to the extent of £50,000 annually. Ships up to 1500 tons will be built. Machinery, boilers and other equipment manufactured in the United Kingdom will be admitted free of duty, while from other countries the duty will be 15 per cent.

Stewarts & Lloyds has obtained a contract totaling £90,000 for pipe lines in Ceylon in connection with hydro-electric development.

Continental mills have advanced prices of shapes for Norway 5s. gold owing to decreased Swedish competition. Merchant bars for shipment to the Balkans have been reduced 4s. gold as a result of cheaper freight rates.

Two Steel Companies to Use Standard's Process

PITTSBURGH—Standard Steel Spring Co., Coraopolis, Pa., has issued a license to Republic Steel Corp., Cleveland, for use of Standard's "corronizing" process, used in applying a non-porous coating of nickel to steel surfaces. This is the second company to be licensed, the first one having been Youngstown Sheet & Tube Co.

...NON-FERROUS...

... Strong tone in copper reflection of European demand and better feeling here ... Tin throws off lethargy and sells at higher prices ... Spelter sales active at 4.75c. ... Lead demand diversified and constant in volume.

NEW YORK, Aug. 8—Although domestic copper consumers had bought heavily in July, they have come into the market for over 22,000 tons of metal already this month. This interest in metal here, together with sizable Japanese purchases and a volatile European market, has resulted in a price advance

to 10.50c. a lb., delivered Connecticut Valley, and the market is temporarily marking time at this higher figure. That the price is firm is generally accepted, however, and the near future may witness even further speculative activity if the London market continues its strong and animated tone. Today's foreign market was in the

neighborhood of 10.70c. a lb., c. i. f. Continental base ports, with sizable sales being marked up each day.

Zinc

The active market of the past fortnight was pretty well choked off yesterday as all producers pushed quotations 15 points higher to 4.75c. a lb., East St. Louis. However, the movement has caused little hardship at the moment as most consumers have been given ample opportunity to cover forward at lower figures. The new quotation opens the way for foreign metal, but domestic smelters are apparently anticipating little trouble from that direction. During the past week, orders amounted to 4779 tons, and 5171 tons of prime Western and 200 tons of brass special were shipped; undelivered contracts now stand at 49,959 tons of prime Western and 1600 tons of brass special.

Lead

The market continued its steady satisfactory pace all last week, even after an advance to 5.05c. a lb., New York, on Thursday. Yesterday was very quiet, however, as a reflection of the holiday in England. Also, this morning showed little movement, although sellers are looking forward to a revival in interest later in the week. The demands of the past week have been very diversified; August is considered practically covered, and September requirements are in the neighborhood of 50 per cent accounted for. There is a good demand for spot metal abroad and prices there are quite strong.

Tin

Probably traceable to the adjournment of Congress, the tin market last week dramatically threw off its lethargy; buying was active near the end of the week and appeared again this morning, despite constant upward shifts in prices. The action of several tin plate makers to come into the market for sizable lots for prompt shipment has led to the belief that many consumers are not so well covered and will have to replenish stocks over the next few weeks. Yesterday was very quiet as London was on a holiday, but activity was pronounced this morning at a New York price of 48.80c. a lb. On first call this morning, the London market was quoted at £229 17s. 6d. for prompt Straits metal, £225 10s. for three-months, and and £231 12s. 6d. for Straits in the Far West.

NON-FERROUS PRICES

Cents per lb. for early delivery

	Aug. 2	Aug. 3	Aug. 4	Aug. 5	Aug. 7	Aug. 8
Copper, Electrolytic ¹	10.375	10.50	10.50	10.50	10.50	10.50
Copper, Lake	10.375	10.50	10.50	10.50	10.50	10.50
Tin, Straits, New York	48.50	48.65	48.85	.....	48.80	48.80
Zinc, East St. Louis ²	4.60	4.60	4.60	4.60	4.75	4.75
Lead, St. Louis ²	4.80	4.90	4.90	4.90	4.90	4.90

¹Delivered Conn. Valley. Deduct ¼c. for New York delivery. ²Add 0.39c. for New York delivery. ³Add 0.15c. for New York delivery.

Warehouse Prices

Cents per lb., Delivered

	New York	Cleveland
Tin, Straits pig	49.60c.	51.50c.
Copper, Lake	11.625c.	11.50c.
Copper, electro	11.50c.	11.50c.
Copper, Castings	11.00c.	11.25c.
*Copper sheets, hot-rolled	18.37c.	18.37c.
*High brass sheets	16.65c.	16.65c.
*Seamless brass tubes	19.40c.	19.40c.
*Seamless copper tubes	18.87c.	18.87c.
*Brass rods	12.00c.	12.00c.
Zinc slabs	6.15c.	6.90c.
Zinc sheets, No. 9 casks	10.75c.	12.10c.
Lead, American pig	6.05c.	5.95c.
Lead, bar	8.50c.	8.25c.
Lead, sheets, cut	8.00c.	8.00c.
Antimony, Asiatic	15.00c.	17.00c.
Alum., virgin, 99 per cent plus	21.50c.	22.50c.
Alum., No. 1 remelt., 98 to 99 per cent	19.00c.	19.50c.
Solder, ½ and ¼	29.25c.	29.50c.
Rabbitt metal, commercial grade	21.25c.	21.50c.

The new prices on copper alloy products had not been announced at time of going to press, but are expected shortly. They will apparently be proportioned on the basis of an ¼c. rise in the price of the base metal.

*These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33 1/3;

on brass sheets and rods, 40, and on brass and copper tubes, 25.

Old Metals

Cents per lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	8.375c.	9.00c.
Copper, hvy. and wire	7.375c.	7.75c.
Copper, light and bottoms	6.50c.	6.975c.
Brass, heavy	4.50c.	5.00c.
Brass, light	3.625c.	4.375c.
Hvy. machine composition	6.50c.	7.375c.
No. 1 yel. brass turnings	4.25c.	4.75c.
No. 1 red brass or compos. turnings	6.375c.	6.875c.
Lead, heavy	4.125c.	4.50c.
Cast aluminum	6.50c.	7.75c.
Sheet aluminum	12.50c.	14.00c.
Zinc	2.25c.	3.50c.

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 20c.-21c. a lb.; No. 12 remelt No. 2 standard, 19c.-19.50c. a lb. NICKEL, electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt, New York: Asiatic, 14c. a lb., f.o.b.; American, 12c. a lb. QUICKSILVER, \$88 to \$90 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 10.50c. a lb.

PLANT EXPANSION AND EQUIPMENT BUYING

◀ NORTH ATLANTIC ▶

General Electric Co., Schenectady, N. Y., plans one-story addition, 80 x 265 ft., at incandescent lamp works, Nela Park, Cleveland, for which bids will be asked soon on general contract. Cost close to \$100,000 with equipment. E. J. Edwards is company engineer at Nela Park plant.

Ethyl Gasoline Corp., 405 Lexington Avenue, New York, high-test gasoline, has approved plans for new branch plant, one-story, 115 x 120 ft., with experimental and testing facilities, at 1050 Nepperhan Avenue, Yonkers, N. Y. Cost over \$75,000 with equipment. M. H. McGuire, 677 Palisade Avenue, Yonkers, is architect.

Signal Corps Procurement District, Army Base, Fifty-eighth Street and First Avenue, Brooklyn, asks bids until Aug. 25 for 7500 to 15,000 ft. of cable, couplings, terminals, etc. (Circular 1), jacks, casing assemblies and other equipment (Circular 3); until Aug. 28, resistors, capacitors, terminal strips, transformers, etc. (Circular 5), 4000 to 12,000 jack boxes, 750 terminal plates, switches, insulator plates, etc. (Circular 4).

Monarch Wine Co., 105 Wooster Street, New York, has leased buildings Nos. 38, 91 and 92, at Bush Terminal, Brooklyn, totaling 25,000 sq. ft. of floor space, for new storage and distributing plant.

Hecker Products Corp., 88 Lexington Avenue, New York, division of Best Foods, Inc., same address, has asked bids on general contract for three-story and basement addition, 100 x 128 ft., to plant at 1437 West Morris Street, Indianapolis. Cost close to \$100,000 with equipment. Lockwood Greene Engineers, Inc., 30 Rockefeller Plaza, New York, is engineer.

Commanding Officer, Ordnance Department, Watervliet Arsenal, Watervliet, N. Y., asks bids until Aug. 17 for two motor-driven automatic screw machines (Circular 68); until Aug. 29 for manufacture of 201 to 350 tubes for guns (Circular 14).

Bell Telephone Laboratories, Inc., 463 West Street, New York, plans new experimental and research plant at Murray Hill, near New Providence, N. J., where about 220-acre tract will be used. Plant will comprise one and multi-story buildings, with mechanical and electrical shops, power house and other structures. Cost about \$3,000,000 with equipment. Voorhees, Walker, Foley & Smith, 101 Park Avenue, New York, are architects.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Aug. 15 for steam-driven emergency-feed and bilge pumps, with spare parts (Schedule 6899); until Aug. 22, heat and flame resistant electric cable (Schedule 6923) for Brooklyn and Philadelphia Navy yards.

Public Service Electric & Gas Co., Public Service Terminal, Newark, N. J., has approved plans for two-story and basement building for electrical distribution department on West Grand Avenue, Elizabeth, N. J., with equipment storage and distributing facilities, service and garage unit for company motor trucks and other departments. Cost close to \$250,000 with equipment.

Commanding Officer, Ordnance Department, Picatinny Arsenal, near Dover, N. J., asks bids until Aug. 14 for two 3-ton bench-type hydraulic presses (Circular 90), metal parts for detonating fuze (Circular 7); until Aug. 15, seamless copper tubing (Circular 52); until Aug. 17, one or two vertical, duplex motor-driven presses, for first-draw case, cal. 0.30 bullets (Circular 47); until Aug. 23, hydraulic, horizontal smokeless powder finishing press (Circular 88); until Aug. 25 for combination punch and shear, three motor-driven turret lathes, one back-gear drill and two motor-driven lathes (Circular 93).

Merck & Co., 126 East Lincoln Avenue, Rahway, N. J., chemical products, has let general contract to White Construction Co., 95 Madison Avenue, New York, for three-story and basement addition, 40 x 100 ft. Cost over \$100,000 with equipment. George P. Butler, Jr., 40 East Forty-ninth Street, New York, is architect.

Canada Dry Ginger Ale, Inc., 100 East Forty-second Street, New York, has leased one and two-story building at Woodland Avenue and Forty-second Street, Philadelphia, totaling 60,000 sq. ft. of floor space, for new branch plant.

Commanding Officer, Ordnance Department, Frankford Arsenal, Philadelphia, asks bids until Aug. 15 for gages for 88-mm. shell (Circular 73); until Aug. 18 for one, two or three annealing furnaces (Circular 46), one or two motor-driven automatic screw machines of three different types for handling tracer bullets (Circular 43).

◀ BUFFALO DISTRICT ▶

General Chemical Co., 350 Abbott Road, Buffalo, has approved plans for expansion and improvements, primarily for nitric acid production, with installation of tanks, towers and other facilities. Cost close to \$500,000 with equipment. Company is a subsidiary of Allied Chemical & Dye Corp., New York.

Rochester Gas & Electric Corp., 89 East Avenue, Rochester, N. Y., has let general contract to A. Friederich & Sons Co., 710 Lake Avenue, for new one-story maintenance, service and equipment building. Cost close to \$200,000 with equipment. William G. Kaelber and L. A. Waasdorp, 311 Alexander Street, are architects.

Pillsbury Flour Mills Co., Lafayette Building, Buffalo, has let general contract to Jones-Hettelsater Construction Co., Mutual Building, Kansas City, Mo., for modernization and expansion in milling plant at 250 Ganson Street. New mechanical-handling and other equipment will be installed. Cost about \$300,000.

◀ WASHINGTON DIST. ▶

Quartermaster, Bolling Field, Washington, asks bids until Aug. 28 for monorail system in hangars Nos. 1 and 2 at New Bolling Field (Circular 154-1).

Standard Cap & Molding Co., Inc., 307 South Eaton Street, Baltimore, has let general contract to C. K. Wells, Jr., 3401 Greenmount Avenue, for one-story addition, 60 x 115 ft. Cost close to \$40,000 with equipment.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Aug. 23 for one-story addition, 120 x 239 ft., to storehouse at naval magazine, Bellevue, D. C. (Specifications 9223); also bids (no closing date stated) for motor-driven air compressor, with inter-cooler and after-cooler, for installation at Norfolk Navy Yard (Specifications 9346).

Rustless Iron & Steel Corp., 3400 East Chase Street, Baltimore, has let general contract to Cummins Construction Corp., 803 Cathedral Street, for one-story addition on Edison Highway. This will form initial unit of proposed expansion, with two adjoining buildings to be erected soon. Cost over \$1,000,000 with equipment.

General Purchasing Officer, Panama Canal, Washington, asks bids until Aug. 14 for 41,500 ft. of chain link fabric, tubular gate posts, gates and other fencing equipment (Schedule 3540), steel foundry nails, pressure gages, sash locks, etc. (Schedule 3537); until Aug. 15, 33 8-in. motor-operated gate valves, with motor and limit switches; 74 10-in. similar valves, and 104 magnetic contactor panels for use

with valves (Schedule 3545), two portable gasoline engine-driven air compressors (Schedule 3542).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Aug. 15 for aluminum alloy pipe, tubing, pipe fittings, rivets, etc. (Schedule 6890) for Eastern and Western Navy yards; pressure gage tester (Schedule 6844) motor-driven air compressors and spare parts (Schedule 6907), 2000-lb. steam drop hammer (Schedule 6880) for Philadelphia yard; gears and pinions (Schedule 6919), 3000-ton motor-driven hydraulic heading press (Schedule 6922), eight electric arc welders and two electric arc welding sets (Schedule 6932) for Washington yard; two electric hydraulic-type windlasses with spare parts, tools and wrenches (Schedule 6909), steel forgings (Schedule 6917) for Norfolk yard.

◀ NEW ENGLAND ▶

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until Aug. 14 for one drill point turning machine, bench-type, with electric motor (Circular 21), four centrifugal compressors (Circular 20); until Aug. 15, horizontal drilling machine with opposed spindle (Circular 17).

Torrington Co., Torrington, Conn., swaging machines, ball bearings, etc., has let general contract to Torrington Building Co., 18 Church Street, for one-story addition, 70 x 90 ft. Cost over \$100,000 with equipment.

New York, New Haven & Hartford Railroad Co., New Haven, Conn., has let general contract to Wadhams, May & Carey, 15 Lewis Street, Hartford, Conn., for steel piling and other work for new one and two-story freight terminal, 50 x 500 ft., and 50 x 100 ft. respectively. Cost over \$200,000 with mechanical-handling, loading and other equipment. E. E. Oviatt is chief engineer.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Aug. 15 for one pickling tank and two wash tanks (Schedule 6895) for Boston Navy Yard; until Aug. 22, oil purifiers, with spare parts, tools and wrenches (Schedule 6883), universal joints (Schedule 6912) for Boston, Charleston and Puget Sound yards; six steel propeller shafts (Schedule 6811) for Portsmouth, N. H., and Mare Island yards.

◀ SOUTH ATLANTIC ▶

Glascok Stove & Mfg. Co., West Lee Street, Greensboro, N. C., plans one-story addition, totaling about 10,000 sq. ft. of floor space. Cost close to \$40,000 with equipment.

Espy Paving & Contracting Co., Savannah, Ga., plans one-story works for production of ready-mixed concrete. Cost close to \$40,000 with mixers, conveyors, loaders and other mechanical-handling equipment.

Atlanta Metallic Casket Co., Atlanta, Ga., has let general contract to J. J. Jones & Co., Walton Building, for new four-story and basement plant at 216 Elliott Street, N. W., 91 x 105 ft. Cost over \$50,000 with equipment.

City Council, Miami, Fla., plans steel hangar at local airport, with repair and reconditioning facilities. Cost about \$110,000 with equipment. C. T. Hansen is city aviation director.

◀ SOUTH CENTRAL ▶

Louisiana State Rice Milling Co., Lake Charles, La., has let general contract to T. Miller & Sons, Lake Charles, for elevator unit at local mill. Cost about \$45,000 with elevating, conveying and other equipment. Company plans erection of two one-story additions for storage and distribution. Cost over \$40,000 with equipment.

United States Engineer Office, Vicksburg, Miss., asks bids until Aug. 17 for 78,800 ft. of plow steel wire rope (Circular 19), one 5-kw. gasoline engine-driven electric generating set (Circular 21).

Reed Unit-Fans, Inc., St. Charles Street, New Orleans, electric fans and allied equipment, plans new one-story plant at 501-503 North St. Patrick Street. Cost about \$40,000 with equipment.

Director of Purchases, TVA, Knoxville, Tenn., asks bids until Aug. 16 for fabricating, galvanizing and delivering steel transmission towers for new power line from Pickwick dam hydroelectric generating station to Memphis, Tenn.; until Aug. 17, filter equipment for water system at Watts Bar dam.

◀ SOUTHWEST ▶

Anheuser-Busch, Inc., 721 Pestlozzi Street, St. Louis, has approved plans for fine-story addition to main brewery at Eleventh and Pestlozzi Streets, for storage and distribution, with fermenting department. Cost close to \$750,000 with equipment.

City Council, Nevada, Mo., plans new municipal electric power plant, using diesel engine-generating units of 1500-kw. capacity and auxiliary equipment. Cost about \$450,000 with distributing system. William Spann, Interstate Building, Kansas City, Mo., is consulting engineer.

United States Engineer Office, 300 Broadway, Little Rock, Ark., asks bids until Aug. 15 for 40 core drilling bits (Circular 3).

Shell Oil Co., Inc., Shell Building, St. Louis, has let general contract to C. F. Braun & Co., Esperson Building, Houston, Tex., for expansion in Deer Park oil refinery, La Porte Road, Houston, including new unit for production of high-test gasoline for aviation service. Cost close to \$1,000,000 with machinery. Company also plans extensions and improvements in Norco branch refinery near New Orleans. Cost about \$250,000 with equipment.

Muehlebach Brewing Co., 316 Oak Street, Kansas City, Mo., plans multi-story addition to main brewery at Fourth Street and Grand Avenue, for storage and distribution. Cost close to \$80,000 with equipment.

Three Rivers Refinery Co., Three Rivers, Tex., Ralph Robinson, managing director, plans new oil refinery, with power house and other mechanical buildings, pumping station and steel tank storage facilities. Cost close to \$100,000 with equipment.

Construction Service, Veterans' Administration, Washington, asks bids until Aug. 15 for deep-well pumping machinery for institution at Legion, Tex.

◀ WESTERN PA. DIST. ▶

Vanadium Corp. of America, Inc., Bridgeville, Pittsburgh, has approved plans for addition to branch mill at Niagara Falls, N. Y., to be used as a furnace unit. Cost close to \$50,000 with equipment. W. J. Morgan is superintendent at Niagara Falls plant.

Edward Hahn Packing Co., Johnstown, Pa., meat packer, plans one-story addition. Cost over \$50,000 with equipment.

◀ OHIO AND INDIANA ▶

Phoenix Ice Machine Co., 2711 Church Avenue, Cleveland, ice-making machinery and parts, refrigeration equipment, etc., plans one-story addition. Cost close to \$50,000 with equipment. Walter G. Caldwell, Engineers' Building, is architect.

Peerless Model Airplane Co., 3088 West 106th Street, Cleveland, small airplane models, miniature railroad specialties, etc., has purchased one-story building at 12900 Berea Road, totaling about 15,000 sq. ft. of floor space, for new plant. Present works will be removed to new location and capacity increased.

Drackett Co., 5020 Spring Grove Avenue, Cincinnati, industrial chemicals, etc., will take bids soon for one-story addition to plant at Sharon and Lockland Roads, near Sharonville. Cost over \$50,000 with equipment.

Murray Ohio Mfg. Co., 1115 East 152nd Street, Cleveland, steel toys, sheet metal stampings, etc., has acquired adjoining property for expansion, consisting of about 2½-acre tract, improved with one-story building of about 75,000 sq. ft. of floor space.

Contracting Officer, Materiel Division, Air Corps, Wright Field, Dayton, Ohio, asks bids until Aug. 14 for wrenches, valve clearance gages, timing pointers, clamps, lifting slings,

pullers, etc. (Circular 42), wrenches, punches, motor jaw gage tools, vertical type gages, concentric type gages, etc. (Circular 41); until Aug. 15, offset wrenches, hook wrenches, tools, stud drivers, indicators, compressor, timing disks and other equipment (Circular 43); until Aug. 16, conduit clamps, flexible conduit connectors, electrical connector elbow assemblies, conduit elbows, etc. (Circular 48); until Aug. 17, aircraft bolts, aircraft nuts, clevis bolts, screws and washers (Circular 56); until Aug. 18, two dry mounting press assemblies (Circular 61), bonding clamps, primer line clamps, support clamps, tube clamps, etc. (Circular 64).

Allison Engineering Co., Speedway City, Indianapolis, airplane engines and parts, has asked bids on general contract for one and two-story addition, 138 x 155 ft., for a testing and experimental building. Cost over \$150,000 with equipment. J. Lloyd Allen, Architects' and Builders' Building, is architect. This is part of \$5,000,000 expansion program now being carried out at this plant. Company is a division of General Motors Corp.

◀ MICHIGAN DISTRICT ▶

Chevrolet Motor Division, General Motors Corp., 3044 West Grand Boulevard, Detroit, has let general contract to Jerome A. Utley, 6031 Mansur Street, for one-story addition, 50 x 200 ft. Cost over \$85,000 with equipment.

Air-Track Mfg. Corp., Detroit, recently organized subsidiary of F. L. Jacobs Co., 1043 Spruce Street, metal tubing, etc., is arranging for expansion for production of navigation and radio precision instruments and parts. Company has authorized financing totaling about \$475,500, of which approximately \$175,000 will be used for purpose noted.

Wheel Trueing Tool Co., 19331 Oakland Street, Detroit, automobile tools and equipment, has let general contract to Henry M. Martens Co., 2111 Woodward Avenue, for new one-story and basement plant at Davison Street and Wildmore Avenue, for parts production and assembling. One-story office also will be built. Cost close to \$60,000 with equipment. Frank Eurich, Jr., Inc., Detroit Savings Bank Building, is architect.

◀ MIDDLE WEST ▶

John Deere Plow Works, Inc., 1225 Third Avenue, Moline, Ill., has let general contract to A. Sugarman, 919 North Michigan Avenue, Chicago, for five-story and basement addition, 95 x 150 ft., for expansion in machine shops and other departments. Cost over \$150,000 with equipment. O. A. Eckerman, first noted address, is company architect.

Commanding Officer, Ordnance Department, Rock Island Arsenal, Rock Island, Ill., asks bids until Aug. 21 for eight engine lathes and 13 tool room precision lathes (Circular 47).

Central Commercial Co., 332 South Michigan Avenue, Chicago, has let general contract to Austin Co., 510 North Dearborn Street, for new rock crushing and processing plant near Marinette, Wis., with power house, for production of roofing granules and other colored pulverized stone. Cost about \$275,000 with equipment.

City Council, New London, Iowa, asks bids until Aug. 22 for expansion and improvements in municipal electric power plant, including 400-kw. steam turbo-generator unit (Section 1), surface condenser, with circulating water pumps, condensate pumps and accessories (Section 2), induced draft type cooling tower (Section 3), boiler unit with capacity of 14,000 lb. of steam per hr., with stoker, control instruments, etc. (Section 4). Young & Stanley, Inc., Muscatine, Iowa, is consulting engineer.

Bureau of Reclamation, Denver, asks bids until Aug. 21 for one 10-ft. cylinder gate, with scroll case, gate guides and accessories, for gate chamber of controlling works for Shoshone Canyon conduit, Heart Mountain Division, Shoshone project, Wyo. (Specifications 1266-D).

Wisconsin Electric Power Co., 231 West Michigan Street, Milwaukee, plans addition to steam-electric generating station on Com-

merce Street, 80 x 134 ft., and 100 ft. high, to include a machine shop, for expansion in steam division. Cost over \$500,000.

North Dakota State Highway Department, Bismarck, N. D., has let general contract to E. A. Moline, 118 Fifth Avenue South, Jamestown, N. D., for one-story and basement addition, 80 x 120 ft., to equipment, maintenance and repair shop at Bismarck. Cost close to \$60,000 with equipment. Ritterbush Brothers, 209 Seventh Street, Bismarck, are architects.

City Council, Fond du Lac, Wis., has awarded contract for main sewage disposal plant on lake shore site to Charles D. Smith, local contractor, who has been authorized to place orders for materials and to start work as soon as conditions at site warrant.

Wisconsin State Prison, Waupun, has started erection of new two-story laundry building to cost about \$70,000 with equipment. In addition to laundry machinery, new equipment will include a 45,000 water tank, two water softeners and a hot water heater.

◀ PACIFIC COAST ▶

Timm Aircraft Corp., 1020 Air Way, Glendale, Cal., airplanes and parts, is arranging for stock issue of about \$400,000, a considerable part of proceeds to be used for plant expansion, including machinery and tools. Company has arranged with Hughes Aircraft Co., for manufacture of Hughes type aircraft.

Livestock Feed Co., 639 Spring Street, Los Angeles, will take bids soon for initial unit of new processing, packing and distributing plant at 2400 Harriett Street, one-story, about 10,000 sq. ft. of floor space. A power house will be built. Additional one-story buildings will be erected later. Entire plant will cost about \$100,000 with equipment. R. McC. Beasfield, Chamber of Commerce Building, is architect.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Aug. 18 for motor-driven, positive displacement rotary pumps and spare parts (Schedule 6903), eight 75-hp. electric motors and spare parts (Schedule 6879) for Puget Sound Navy Yard; 140 acetylene gas cylinders (Schedule 6888) for Puget Sound and Mare Island yards; until Aug. 22, eight lubricating oil purifiers, eight diesel fuel oil purifiers and spare parts (Schedule 6897) for Puget Sound yard; electric cable (Schedule 6894) for Mare Island yard; motor-driven grinder (Schedule 6896), four electric arc welding sets (Schedule 6892) for San Diego naval air station.

Electric Steel Foundry Co., 2436 North York Street, Portland, has let general contract to Wegman & Son, Board of Trade Building, for one-story addition to foundry, about 5000 sq. ft. of floor space, for expansion in steel casting cleaning department, with storage and distributing facilities.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Aug. 23 for one-story storehouse and power plant at naval air station, Alameda, Cal. (Specifications 8990). Appropriation of \$725,000 is available.

◀ FOREIGN ▶

International Alloys, Ltd., Buckingham Avenue, Trading Estate, Slough, Bucks, England, aluminum and aluminum alloys, has approved plans for new plant at Cardiff, Wales, for manufacture of magnesium products, with power house, shops and miscellaneous buildings. Facilities will be installed for employment of about 1000 men, with equipment to cost about \$500,000.

Canadian Associated Aircraft, Ltd., 1050 Beaver Hall Hill, Montreal, Que., airplanes and parts, has let general contract to Atlas Construction, Ltd., 879 Belmont Street, for new one-story plant at St. Hubert, Que., for assembling. Cost about \$175,000 with equipment.

Bowater's Newfoundland Pulp & Paper Mills, Ltd., Corner Brook, Newfoundland, Canada, manufacturer of newsprint, plans one-story addition for expansion in sulphite pulp division. Cost over \$300,000 with machinery.

THIS WEEK'S MACHINE ... TOOL ACTIVITIES ...

... Domestic sales are spotty, but combined with foreign business machine tool builders find demand steady ... Active fall buying is looked for.

Cincinnati Builders Report Steady Tool Demand

CINCINNATI—Reports on machine tool activity in this area during the month of July indicate that business was perhaps just a shade better than in June. Foreign ordering continued to be aggressive as it has been for most of the current year, while the domestic ordering showed some indications of a tendency toward expansion. This steadiness of demand is not only encouraging in and for itself, but is particularly significant in that it is obvious that current demand is resisting normal tendencies toward a seasonal tapering. Generally, therefore, the market is definitely optimistic with a noticeable feeling that perhaps with the advent of fall, further rise in the current demand will be noticeable.

During the past week a decline in foreign ordering for lathes was noted which, while offset to a small degree by a broadening of domestic ordering for the same type of tool, nevertheless brought the market averages slightly under that of the preceding week. A number of propositions, however, are still pending and are likely to be closed any time during the present month which will necessarily offset the small decrease during the past week.

Manufacturers of milling machines, grinders and broaching machines also indicated a small improvement in domestic demand during the past week, and generally over the market there was practically no change in ordering, except as before noted.

Plant operations in the area are above 60 per cent, with several factories now operating virtually at capacity. Despite the general good average of production, manufacturers report that deliveries are becoming more protracted.

Month Starts Slowly With Cleveland Sellers

CLEVELAND—Outside of a few lathe sales, August got off to a very inauspicious start here. Dealers believe, however, that this lull is only temporary as industrial inquiry for a widely diversified line of equipment continues on a high plane. The bulk of outstanding inquiries is for lighter machines, but there are several heavy machines, which will probably cost over \$70,000 each, out for bidding. Export inquiry is as brisk as ever, with a request for prices on a large hydraulic press for Rumania outstanding. Available statistical evidence indicates that both domestic and foreign sales of manufacturers in this district showed gains over June, with domestic business registering a proportionately greater im-

provement. The Warner & Swasey plant resumed operations on July 31 after its annual two-week mass vacation.

August Sales Get Off to Good Start in the East

NEW YORK—Contrasted with the first week in July, which was entirely non-productive of machine tool orders, and with the average month, which starts off slowly, the business done by dealers and direct factory representatives in this area was well above average for the first few days of August. This condition is the more surprising since many local plants have been or are about to shut down for vacation periods of one to two weeks. On the other hand, it was the substantial buying of one large electrical equipment manufacturer, well scattered among the trade, that stood out, although there was spotty buying from other sources, including government purchases. By the above it is not implied that sales are booming, but they are above expectations for mid-summer.

... PIPE LINES ...

Stanolind Pipe Line Co., Philcade Building, Tulsa, Okla., affiliated with Stanolind Oil & Gas Co., same address, both subsidiaries of Standard Oil Co. of Indiana, Chicago, plans new welded steel pipe line from Cayuga oil field district, Anderson County, Tex., to pumping station at Palestine, Tex., about 35 miles, for crude oil transmission. Of distance noted, 16 miles will be 8-in. pipe and remainder 6-in. Connection will be made at Palestine with main pipe line system of company. Surveys are being completed and work is scheduled to begin soon.

General Gas Pipe Line Corp., Circle Tower Building, Indianapolis, plans around 40 miles of 3, 4, 6 and 8-in. steel pipe lines for gathering system in gas field area of Hart County, Ky., in connection with new 20-in. welded steel pipe line from that district to Hamilton County, Ind., about 180 miles, for natural gas transmission, recently noted in these columns. Hearing on application before Federal Power Commission, Washington, is scheduled Sept. 7.

Eunice, La., asks bids until Aug. 29 for pipe line system for natural gas distribution system, including control station and other operating facilities. Cost about \$60,000.

Northern Natural Gas Co., Aquila Court Building, Omaha, Neb., has authorized a note issue of \$6,000,000, of which about \$3,600,000 will be used for construction of new welded steel pipe line from point near Sioux City, Iowa, to Minneapolis, Minn., close to 250 miles, for natural gas transmission; and sum of \$1,200,000 for lateral pipe lines at different points, pipe lines for distribution systems operated by subsidiary interests, compressor sta-

Much more active buying is looked for in the fall, particularly following the machine tool show at Cleveland.

Auto Plants Place Only Fill-in Orders

DETROIT—Occasional buys still are being made to clean up the tool and machine programs for the Ford tractor and the Detroit Transmission division of General Motors. Settlement of the tool and die strike against G. M. has loosened the bonds that were preventing many deliveries and installations in G. M. plants. It is difficult to cite any outstanding activity in the auto industry, and, for a period at least, duplicate orders, clean-up orders and replacements will constitute the only machine tool buying activity in the auto plants as 1940 production is pushed.

August Sales Off to Slow Start at Chicago

CHICAGO—Actual business placed this first week of August has not been important, but considerable business is being figured, and local sellers are anticipating good results before the month ends. One sales office reported a 40 per cent drop in small tool orders for July, as compared with June. The Rock Island Arsenal and the International Harvester Co. remain the two largest buyers in this district, with some business emanating from these sources nearly every week. The arsenal issued an inquiry last week for a 120-in. gear cutting machine, a 12-in. bevel gear cutter, and a 36-in. spur and bevel gear cutter.

tion properties and development cost incidental to new main line. Remainder of fund, \$1,200,000, will be used for extensions and improvements in existing pipe lines and properties.

Southern California Gas Co., 810 South Flower Street, Los Angeles, has awarded contract to Pacific Crane & Rigging Co., 6300 South Alameda Street, Huntington Park, Cal., for new steel pipe line from connection with present system to Crest Forest district, San Bernardino, Cal., about 30 miles, for gas transmission. Cost close to \$160,000.

Houma, La., has low bid from Brown & Root, Inc., 4300 Calhoun Road, Houston, Tex., at \$144,452 for pressure pipe line system for natural gas distribution, including main welded steel line for connection with supply source, lateral lines, regulator stations and auxiliary structures. Award is scheduled to be made soon. T. Baker Smith, Houma, is engineer.

Utah Oil Refining Co., Salt Lake City, Utah, T. A. Dines, president, a subsidiary of Standard Oil Co. of Indiana, Inc., Chicago, has awarded contracts to four companies for new 8- and 6-in. welded steel pipe line from Fort Laramie, Wyo., to Salt Lake City, about 438 miles, as follows: Lang & Coyne Co., Salt Lake City; Osage Construction Co., Casper, Wyo.; Williams Brothers Corp., Tulsa, Okla.; and Truman-Smith Co., Eldorado, Kan. Work is scheduled to begin at once. As recently noted in these columns, line will be used for crude oil transmission from Wyoming oil field area to company refining plant at Salt Lake City; of total distance mentioned, 414 miles will be 8-in. Cost about \$6,000,000 with booster pumping stations and other operating facilities.

JUST BETWEEN US TWO

Mea Culpa

Because our Oberleutnant has a pathological horror of exaggeration we studiously practice understatement, being careful, of course, to let it be known that we are understating.

But occasionally we err. Just before we left on our annual excursion to prove that fish are still allergic to us we boasted that four out of every five of your favorite family journal's readers re-subscribe. This is an exaggeration.

The true percentage, as revealed by our current circulation analysis, is 79.79, a figure that looms up like a skyscraper on a prairie.

Bars, Bombs, Buoys

The incredible variety of metal goods bought by the Government, as reported here each week keeps us perpetually bug-eyed. A recent list included lingual bars, miniature practice bombs, gasoline interceptors, a rum distillation unit and nun buoys.

Can our omniscient Washington editor, Leon Wesley ("Moff") Moffett, tell us what a nun buoy is and who drinks the rum?

Reverse English

To the list of odd automotive terms add "bumping." In the Detroit sector it means removing bumps from fenders and bodies.

Specialist

Detroit is also the home of our candidate for the product specialization prize—the Solid-Back Brush Machinery Company.

Rhetorical Rumba

For top honors in the year's question-begging contest, we submit this from a contemporary:

"All the fancy laws, all the pump priming, all the efforts to make over life in America which are largely nonsense, and already have proved unworkable, won't do the trick of promoting prosperity."

Bell-Ringer

That series dealing with the effect of mechanization on employing power has definitely hit the pocket between the headpin and No. 3 pin. It is attracting nationwide attention; the newspapers are reprinting it; our mail is full of comment regarding it; employers generally show marked interest in its revelations.

Reprints of Chapter No. 4 (page 11) are available at cost. We can still supply the second and third chapters, but the demand has emptied the No. 1 bin. The series is stirring even the medical profession. A Tujunga, Calif., M.D. sends in a check for past chapters and those to come.

... Where Angels Fear ...

"Weldments" is a word used by one of the advertisers in the new "Parts Made to Order" section. Maybe this term has been made official by the big shots in the welding field, but if it isn't too late, why not drop it and use the logical term, *weldings*, to harmonize with castings, forgings, and stampings?

Puzzles

Nobody solved the one about whether a monkey would be hit if he dropped from a tree the instant a gun aimed at him was fired. So we asked Thomas Abraham, who sent it in, for the answer. The monkey is dead, we are sorry to announce.

Regardless of the distance between the monkey and the hunter (within the gun's range, of course) mathematically the monkey can't escape his rendezvous with the bullet, for the distance he falls corresponds exactly with the bullet's trajectory. He could, of course, beat the game by springing down, but that wouldn't be sporting.

The answer to the July 13 problem about the hasty motor car driver is about 1485 ft., as Charles S. Kinnison and J. Malvern Benjamin found out without half trying. Now do this one in three minutes and win a scholarship:

A boy has enough marbles to form three solid identical triangles. He takes the marbles from two of the triangles, piles them on the third, and forms a perfect pyramid. How many marbles has he?

Nom de Shovel

Speaking of pyramids, Tom Lippert, our metallurgical editor, says he sees steam shovels in Plainfield, N. J., lettered, "Terrible Construction Co."

—A.H.D.

HOW TO DO A GOOD JOB



ROTOBLASTING

FOR QUICKER, LOWER COST CLEANING OF CASTINGS, FORGINGS, ETC., BY AIRLESS BLAST EQUIPMENT.

These ten TYPICAL USERS bought \$306,519.00 of Rotoblast equipment.

BUICK MOTOR CO.	Flint, Michigan
CHEVROLET MOTOR CO.	Toledo, Ohio
CAMPBELL, WYANT & CANNON	Muskegon, Mich.
FORD MOTOR CO.	Dearborn, Michigan
NASH MOTORS CO.	Kenosha, Wisconsin
PACKARD MOTOR CO.	Detroit, Michigan
PONTIAC MOTOR CO.	Pontiac, Michigan
STUDEBAKER CORP. OF AMERICA	South Bend, Ind.
UNION CARBIDE & CARBON CORP.	Niagara Falls, N. Y.
U. S. PIPE & FOUNDRY CORP.	Burlington, N. J.

THE ROTOBLAST airless cleaning of castings, forgings, heat-treated parts, etc., is another "OK" for Pangborn.

Special automatic ROTOBLAST Machines are now cleaning 240 automobile cylinder blocks, or 720 chair frame parts, or equivalent tons of smaller work per hour, at a lower cost per ton than ever before.

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CLEANING AND DUST CONTROL EQUIPMENT

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PRODUCTS INDEX

WHO MAKES IT

Here you find a weekly listing of hundreds of products with the names and addresses of manufacturers. The advertisements of these companies appear in The Iron Age.

ABRASIVE CLOTH & PAPER

Norton Co., Worcester, Mass.

ABRASIVE WHEELS—See Grinding Wheels

ABRASIVES—Steel Shot and Grit

American Foundry Equipment Co., The, 510 S. Byrkit St., Mishawaka, Ind.

Harrison Abrasive Corp., Manchester, N. H.

Pangborn Corporation, Hagerstown, Md.

Pittsburgh (Pa.) Crushed Steel Co.

Steel Shot & Grit Co., Boston, Mass.

ACCESSORIES—Welding

Lincoln Electric Co., The, Cleveland.

ACCUMULATORS—Hydraulic

Baldwin-Southwark Corp., Southwark Div., Philadelphia.

Lake Erie Engineering Corp., 68 Kenmore St., Buffalo, N. Y.

Watson-Stillman Co., The, 103 Aldene Road, Roselle, N. J.

Wood, H. D. & Co., Philadelphia.

ACETYLENE—Dissolved in Cylinders & Small Tanks

Air Reduction Sales Co., 60 East 42nd St., N. Y. C.

Linde Air Products Company, The, 60 East 42nd St., N. Y. C.

ACIDS—Pickling

American Chemical Paint Co., Ambler, Pa.

ALLOYS—Copper

American Brass Co., The, Waterbury, Conn.

Mallory, P. H. & Co., Inc., Indianapolis, Ind.

ALLOYS—Ferro

Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

ALLOYS—Magnesium

Aluminum Co. of America, 1701 Gulf Bldg., Pittsburgh.

Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

ALLOYS—Tungsten

Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

ALLOYS—Vanadium

Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

ALLOYS—Zinc Base Die Casting

New Jersey Zinc Co., The, 160 Front St., N. Y. C.

ALUMINUM

Aluminum Co. of America, Pittsburgh.

ANMMETERS & VOLTMETERS

General Electric Co., Schenectady, N. Y.

Western Electrical Instrument Corp., New ark, N. J.

ANMMETERS AND VOLTMETERS—Recording

Leeds & Northrup Co., 4958 Stanton Ave., Philadelphia.

AMMONIA RECOVERY PLANTS

Koppers Co., Engineering & Construction Div., Pittsburgh.

ANGLES, BEAMS, CHANNELS AND TEES

Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.

Inland Steel Co., Chicago.

Jones & Laughlin Steel Corp., Pittsburgh.

Ryerson, Jos. T. & Son, Inc., Chicago.

Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago.

Steel & Tubes, Inc., Cleveland.

Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

ANGLES, BEAMS, CHANNELS & TEES—Magnesium Alloys

Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

ANNEALING—See Heat Treating

ANNEALING BOXES

Pittsburgh (Pa.) Annealing Box Co.

United Engineering & Fdry. Co., Pith.

ANNEALING COVERS

Pittsburgh (Pa.) Annealing Box Co.

ANODES—Lead

National Lead Co., 111 Bdway., N. Y. C.

APPAREL—Welding

Lincoln Electric Co., The, Cleveland.

ARBERS

Cincinnati (Ohio) Milling Mch. Co., The

Morse Twist Drill & Mch. Co., New Bedford, Mass.

ARMORING MACHINERY—Cable, Wire, Hose

Sleeper & Hartley, Inc., Worcester, Mass.

ARRESTERS—Spark

Harrington & King Perforating Co., Chicago.

ASBESTOS

Carey, Phillip, Co., The, Cincinnati, Ohio.

Johns-Manville Corp., 22 East 40th St., N. Y. C.

AXLES—Car or Locomotive

Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

BABBITT METALS

Buntz Brass & Bronze Co., The, Toledo, Ohio.

Cadman, A. W., Mfg. Co., Pittsburgh.

Cramp Brass & Iron Foundries Co., Philadelphia.

Gardiner Metal Co., 4884 S. Campbell Ave., Chicago.

National Lead Co., 111 Bdway., N. Y. C.

BALANCING EQUIPMENT

Sundstrand Machine Tool Co., Rockford, Ill.

BALANCING MACHINES—Static Dynamic

Gisholt Machine Co., Madison, Wis.

BALING PRESSES—Scrap—See Presses—Baling

BALLS—Burnishing

Abbott Ball Co., The, 1047 New Britain Ave., Hartford, Conn.

Hartford (Conn.) Steel Ball Co., The.

Abbott Ball Co., The, 1047 New Britain Ave., Hartford, Conn.

Hartford (Conn.) Steel Ball Co., The.

New Departure Div., General Motors Corp., Bristol, Conn.

SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.

BANDS—Steel

Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

BARRETS—Burnishing

Abbott Ball Co., The, 1047 New Britain Ave., Hartford, Conn.

BARRELS—Tumbling

Baird Mch. Co., The, Bridgeport, Conn.

Hartford (Conn.) Steel Ball Co., The.

Whiting Corp., Harvey, Ill.

BARS—Alloy

Midvale Co., The, Nicetown, Phila., Pa.

Republic Steel Corp., Cleveland, Ohio.

BARS—Aluminum

Aluminum Co. of America, Pittsburgh.

BARS—Brass, Bronze or Copper

Bunting Brass & Bronze Co., Toledo, Ohio.

Johnson Bronze Co., 505 So. Mill St., New Castle, Pa.

BARS—Cold Drawn

American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Cleveland.

Bliss & Laughlin, Inc., Harvey, Ill.; Buffalo, N. Y.

Jones & Laughlin Steel Corp., Pittsburgh.

Monarch Steel Co., Indianapolis, Ind.

Union Drawn Steel Div., Republic Steel Corp., Massillon, Ohio.

BARS—Concrete, Reinforcing

Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.

Jones & Laughlin Steel Corp., Pittsburgh.

Laclede Steel Co., St. Louis, Mo.

Nicetown Plate Washer Co., Inc., Philadelphia.

Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

BARS—Magnesium Alloys

Aluminum Co. of America, 1701 Gulf Bldg., Pittsburgh.

Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

BARS—Rustless

Midvale Co., The, Nicetown, Phila., Pa.

Rustless Iron & Steel Corp., Baltimore, Md.

BARS—Steel

Bethlehem (Pa.) Steel Company.

Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Great Lakes Steel Corp., Ecorse, Detroit

Inland Steel Co., Chicago.

Jones & Laughlin Steel Corp., Pittsburgh.

Laclede Steel Co., St. Louis, Mo.

Monarch Steel Co., Indianapolis, Ind.

Republic Steel Corp., Cleveland, Ohio.

Ryerson, Jos. T. & Son, Inc., Chicago.

Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago.

Steel & Tubes, Inc., Cleveland.

Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

Timken Roller Bearing Co., The, Canton, O.

Timken Steel & Tube Div., The Timken

Roller Bearing Co., Canton, O.

Youngstown (Ohio) Sheet & Tube Co., The.

BATTERIES—Storage

Electric Storage Battery Co., The, Phila.

BATTERY CHARGERS

Cutler-Hammer, Inc., Milwaukee.

BEAMS—See Angles, Beams, Channels and Tees

BEARINGS—Babbitt

Bunting Brass & Bronze Co., The, Toledo, Ohio.

Cadman, A. W., Mfg. Co., Pittsburgh.

Johnson Bronze Co., 505 So. Mill St., New Castle, Pa.

BEARINGS—Ball

Bantam Bearings Corp., The, South Bend, Ind.

Bearings Co. of America, Lancaster, Pa.

Federal Bearings Co., Inc., The, Poughkeepsie, N. Y.

New Departure Div., General Motors Corp., Bristol, Conn.

SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.

Schatz Mfg. Co., Poughkeepsie, N. Y.

BEARINGS, Brass and Bronze

Ameco Metal, Inc., Milwaukee, Wis.

Bunting Brass & Bronze Co., Toledo, O.

Johnson Bronze Co., 505 So. Mill St., New Castle, Pa.

BEARINGS—Oilless

Hunting Brass & Bronze Co., Toledo, O.

Rhodads, R. W. Metalline Co., Inc., Long Island City, N. Y.

BEARINGS—Quill

Bantam Bearings Corp., The, South Bend, Ind.

BEARINGS—Radial

Bantam Bearings Corp., The, South Bend, Ind.

Federal Bearings Co., Inc., The, Poughkeepsie, N. Y.

Hyatt Bearings Div., General Motors Corp., Newark, N. J.

New Departure Div., General Motors Corp., Bristol, Conn.

SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.

Schatz Mfg. Co., The, Poughkeepsie, N. Y.

BEARINGS—Roll Neck

Bantam Bearings Corp., The, South Bend, Ind.

Morgan Construction Co., Worcester, Mass.

SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.

Timken Roller Bearing Co., The, Canton, O.

BEARINGS—Roller

Bantam Bearings Corp., The, South Bend, Ind.

Hyatt Bearings Div., General Motors Corp., Newark, N. J.

Link-Belt Co., 519 North Holmes Ave., Indianapolis, Ind.

SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.

Timken Roller Bearing Co., The, Canton, O.

BEARINGS—Roller Tapered

Bantam Bearings Corp., The, South Bend, Ind.

Timken Roller Bearing Co., The, Canton, O.

BEARINGS—Rolling Mill Equipment

Bantam Bearings Corp., The, South Bend, Ind.

Morgan Construction Co., Worcester, Mass.

SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.

Timken Roller Bearing Co., The, Canton, O.

BEARINGS—Shaft Hanger

Hyatt Bearings Div., General Motors Corp., Newark, N. J.

SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.

BEARINGS—Thrust

Bantam Bearings Corp., The, South Bend, Ind.

Bearings Co. of America, Lancaster, Pa.

Federal Bearings Co., Inc., The, Poughkeepsie, N. Y.

Hyatt Bearings Div., General Motors Corp., Newark, N. J.

New Departure Div., General Motors Corp., Bristol, Conn.

SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.

Schatz Mfg. Co., The, Poughkeepsie, N. Y.

Timken Roller Bearing Co., The, Canton, O.

BELT—Conveyor, Elevator

Goodrich, B. F. Co., The, Akron, Ohio.

Howitt Rubber Corp., Buffalo, N. Y.

Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

BELTING—Leather

Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

BELTING—Metal, Conveyor, High and Low Temperature

Wickwire Spencer Steel Co., 500 Fifth Ave., N. Y. C.

BELTING—Rubber

Goodrich, B. F. Co., The, Akron, Ohio.

Howitt Rubber Corp., Buffalo, N. Y.

Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

BELTS—V-Type

Allis-Chalmers Mfg. Co., Milwaukee.

Goodrich, B. F. Co., The, Akron, Ohio.

Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

BENCH LEGS—Steel

New Britain-Gridley Machine Div., The New Britain Machine Co., New Britain, Conn.

BENDING MACHINES—Hand, Band and Angle

Excelsior Tool & Mch. Co., E. St. Louis, Ill.

BENDING MACHINES—Hand and Power

Buffalo (N. Y.) Forge Co., 193 Broadway, Cincinnati (Ohio) Shaper Co., The, Cleveland (Ohio) Punch & Shear Works Co., The.

Niagara Machine & Tool Works, Buffalo, N. Y.

BENZOL RECOVERY PLANTS

Koppers Co., Engineering & Construction Div., Pittsburgh.

BERYLLIUM COPPER

American Brass Co., The, Waterbury, Conn.

BEZELS & ESCUTCHEONS

Grammer, L. F. & Sons, Inc., Allentown, Pa.

BILLETS—Alloy

Harrisburg (Pa.) Steel Corp.

Midvale Co., The, Nicetown, Phila., Pa.

BILLETS—Alloy Steel